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ADDRESSES AND ORIGINAL ARTICLES

FUNCTIONAL EFFICIENCY AND BODY-BUILD IN THE YOUNG MALE ADULT

By H. A. Treadgold, M.D., M.R.C.P. Lond.
GROUP CAPTAIN, ROYAL AIR FORCE

Functional efficiency.—This term is used in the present paper to imply the possession of the three following attributes: (1) capacity to endure severe or prolonged physical stress; (2) capacity to endure severe or prolonged mental stress; (3) a high resistance to disease and a more rapid recovery-rate than normal if any such disease is contracted.

Body-build.—This term is used to express the relationship between age, height, and weight, and is recorded in terms of weight. Under-weight and over-weight are shown in kilogrammes below and above normal standards respectively. This normal weight for any given age and height can be obtained from various tables, principally American.

The "seven offices" tables,[1] compiled from 28,697 British males examined for life insurance in this country during 1921 and 1922, are used as a standard in the present paper. They cover ages from 15 to 60 and heights from 5 ft. 3 in. (160 cm.) to 6 ft. 2 in. (188 cm.). To avoid the inconvenience of having to refer to the tables on every occasion, F. H. Sherriff[2] suggested a formula for weight in pounds and height in inches, as follows:—

$$\text{Weight in pounds} = 2/3_x + 4(h_x - 61) + 100$$

where x = age, and h_x = height in inches at age x

and stated that in extreme cases—i.e., where the age was over 50 or the height over 72 in.—the error rarely exceeded 2 per cent., and for average ages not more than 1 per cent.

As the age-limits involved in the cases to be considered vary between 18 and 40, Mr. Sherriff has kindly provided me with two further formulæ, which, owing to the smaller range of age involved, are still more accurate.

To calculate weight in kilogrammes:—

$$\text{Weight} = 2/5_x + 2/3h_x - 60,$$ where h_x = height in cm. at age x.

For pounds and inches, formula is:—

$$\text{Weight} = 1/11(10_x + 43h_x) - 145.$$

Even for extremes of height the error rarely exceeds 1 per cent., whichever formula is used.

The body-build of all cases shown in this paper has been obtained from the tables themselves, as the formulæ are necessarily not so accurate, but for approximate calculation of body-build they are both useful and convenient. Stripped weights and actual heights were obtained in all cases.

In order to study the connexion, if any, between variations in body-build and functional efficiency, it is first necessary to determine the average body-build of entrants to the Royal Air Force at the time of entry. Airman recruits and pilots must be considered separately as the former are examined at the R.A.F. Recruiting Depôt and considered only as to their fitness for general service, whereas pilots are examined at the Central Medical Establishment and undergo a much more searching examination. It should be explained that the term "airman" in the R.A.F. is used to designate "other ranks" as distinguished from officers. It does not, per se, imply flying capacity, but certain specially selected airmen are trained as pilots and are examined at the Central Medical Establishment in the same way as other pilots, prior to acceptance. "Pilots" include these, but consist mainly of officers.

Fig. 1 shows the body-build on entry of 1000 accepted airman recruits. These figures were obtained from the first 200 accepted during each of the five years 1928–32. The black column shows the percentage whose actual weight agreed, to the nearest kilogramme, with the normal weight for their age and height shown in the "seven offices" tables ("correct" weight). The shaded portion on each side of the black column shows the percentage falling within limits arbitrarily selected as representing a reasonable allowance for normality, and extends from −3 to +3 kilogrammes—i.e., a total range of 7 kg., equivalent to somewhat over 1 st. ("normal" cases). To the left of the shaded portion the height of the various columns shows the percentage of recruits with increasing degrees of under-weight on entry, as one reads from right to left ("under-weight" cases). The columns on the right of the shaded portion similarly show percentages in the case of over-weight recruits ("over-weight" cases). It will be seen that there are more than twice as many cases to the left of the shaded portion (31 per cent.) (under-weight cases) as there are to the right (15 per cent.) (over-weight cases).

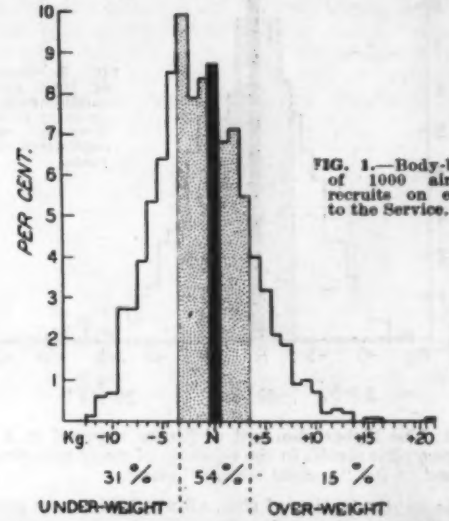

FIG. 1.—Body-build of 1000 airman recruits on entry to the Service.

This and the succeeding diagrams show the percentage distribution in one kilogramme weight-groups. The height of the black column gives the percentage of those whose actual weight agreed with that calculated from their age and height. The breadth of the column represents one kilogramme. The black column and shaded portion extending from −3 kg. to +3 kg. represent the amount allowed for normality. To the right and left of this the height of the columns shows the varying percentage distribution of over-weight and under-weight groups respectively. Average age of recruits on entry was 19 years.

Fig. 2 shows a similar series of 1000 consecutive cases of successful candidates for piloting examined at the Central Medical Establishment. Compared with Fig. 1, the main difference is that now there is a greater proportion of over-weight cases (29 per cent., compared with 15 per cent. among airmen), and a smaller proportion of under-weight cases (22 per cent., compared with 31 per cent. in airmen). The percentage of those of normal body-build as represented by the shaded and black portions of both figures is 54 for airmen and 49 for flying candidates.

[1] Tyler, V. W.: Jour. of Inst. of Actuaries, 1923, liv., 216.
[2] Ibid., 1933, lxiv., 106.

These differences are probably due to two main causes:—

(1) Candidates for flying come mainly from a higher social class than airmen, and have the advantages of a more ample and varied dietary and better hygienic surroundings in childhood and adolescence, as well as the opportunity of indulging to a greater extent in games and athletics.

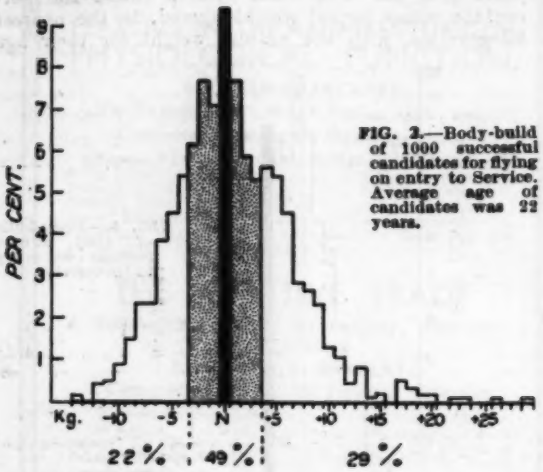

FIG. 2.—Body-build of 1000 successful candidates for flying on entry to Service. Average age of candidates was 22 years.

(2) The higher standard of fitness required in a prospective pilot results in the rejection of many who would be passed fit for "general service" alone.

As an illustration of this, all available cases rejected for flying on grounds of cardiovascular inefficiency (220), as judged by the R.A.F. tests and standards, were collected, and Fig. 3 shows that the proportion of over-weight to under-weight cases in this group compared with successful candidates shows a striking change, as the under-weight group has increased from 22 to 43 per cent., and the over-weight group has decreased from 29 per cent. in successful candidates to 14 per cent. among those rejected. Many of these cases were well up to the recruiting standard for airmen and none of them had any organic disability.

In order to investigate what relation, if any, existed between body-build and capacity to endure severe or prolonged physical stress, the body-builds of as many airmen as possible, who competed in the R.A.F. athletic championships at Uxbridge in 1933, were obtained at the commencement of training. Fig. 4 shows the body-build of these men and the marked preponderance of over-weight to under-weight cases—i.e., 4 to 1, in striking contrast to the 1 to 2 proportion in the case of recruits (Fig. 1). As a control to these figures, the body-build of 500 airmen was obtained from 25 R.A.F. stations at home in 1933 (Fig. 5). Their only qualification for admission to the series was that none of them had competed in the championships—in other words, they were a fairly typical example of the ordinary serving airman. Fig. 5 shows that although the proportion of over-weights among this control-group is higher than among recruits on entry, it is still far below the corresponding proportion in athletes in Fig. 4.

A further analysis of this series, divided up according to the different events in which they competed, is shown in Fig. 4, *a*, *b*, *c*, *d*. In the tug-of-war teams (Fig. 4 *a*) there is, as might be expected, an overwhelming preponderance of over-weights to under-weights (22 : 1). In the field events (Fig. 4 *b*) this is not so marked (6 : 1), but still very definite. In the sprints (100 yards, 220 yards, quarter-mile, 120 yards hurdles) (Fig. 4 *c*) it is reduced to 4½ : 1. In the long-distance events, however (Fig. 4 *d*), for the first time there is a definite preponderance of under-weights, who are 2½ times as numerous as over-weights.

The personnel of the recent Mount Everest Climbing Expedition, who were examined at the Central Medical Establishment before they left for India, shows an even more pronounced under-weight tendency. Of the 15 individuals examined, only 1 was over-weight (+16 kg.); his general physical condition was poor and he proved a failure. Of the remaining 14, half were definitely under-weight (more than −3 kg.) and the remainder normal (within ±3 kg. of their calculated weight from age and height).

Where sheer bodily strength is an essential factor, as in the tug-of-war and, to a less extent, in the field events, over-weights might reasonably be expected to preponderate. The marked difference in body-build between sprint and long-distance athletes, however, requires some explanation. In sprint work there is a maximum and prodigal expenditure of energy regardless of consequences for a brief period. A big frame with a well-developed and powerful musculature is best adapted to meet this, as the extra weight involved is not a serious handicap where the effort is maximal for a brief period. Long-distance work, on the other hand, involves far less expenditure of energy over the same period and its conservation is all-important. Extra body-weight must inevitably increase the work thrown on the heart, and the longer the distance the more important does this factor become. Consequently, the individual with the minimum body-weight consistent with adequate performance is likely to prove most successful in the long run. The average height and weight of the entrants of the long-distance events were 173 cm. and 63 kg., compared with 175 cm. and 68 kg. of the sprint entrants.

The conclusion to be drawn is that capacity to endure severe or prolonged physical stress, as illustrated by proficiency in athletics, is met with more frequently in over-weight than in under-weight individuals, but there is a definite exception to this general rule in the case of long-distance athletes, in whom the converse occurs. The Mount Everest personnel is a good illustration of this point.

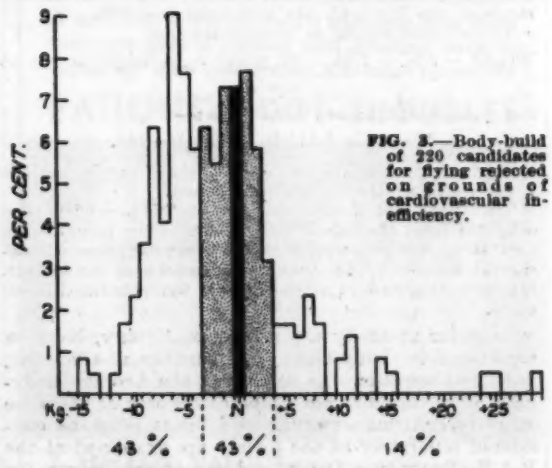

FIG. 3.—Body-build of 220 candidates for flying rejected on grounds of cardiovascular inefficiency.

The connexion between liability to disease and body-build was investigated by studying the body-build on entry of as many cases as possible among both airmen (ground personnel) and pilots, invalided from the service on purely medical grounds, no

surgical cases being included. If it is granted that these cases represent, as a class, individuals whose powers of disease-resistance and recovery are below the normal of their class, a comparison between the body-build of the invalids on entry and of the normal airman or pilot will then show what part, if any, body-build plays in this connexion. Airmen and pilots must be considered separately owing to the different medical standards of entry, the different nature of their duties, and also their different treatment when the question of invaliding arises.

AIRMEN

Fig. 6 shows the body-build on entry of 340 cases of airmen invalided from the Service on purely medical grounds. Comparison with Fig. 1 showing the body-build of airmen on entry reveals that the proportion of under-weight to over-weight individuals has altered from 2 : 1 to 6 : 1, the actual figures being 48 per cent. under-weight compared with 8 per cent. over-weight. Put in another way, practically half of all airman medical invalids are more than −3 kg. under-weight on entry to the Service. Fig. 7, based on the 340 cases of airman invalids, shows the relative likelihood of an airman being invalided according to his body-build on entry. Where the thick lines intersect in the middle of the diagram, the probability is represented as unity. Below this point it is less than one, above it greater than one, the ratio being indicated by the figures on the left and right of the diagram starting at 0·4 below and reaching to 4 above. To the right and left of the middle line the body-build is expressed in kilogrammes above or below normal for age and height. It will be noticed that the curve is above normal for all under-weight groups and becomes steeper as the degree of under-weight increases. The curve is below normal in cases of moderate over-weight. The diagram shows two main points :—

(1) The greater the degree of under-weight on entry the higher is the probability of invaliding.

(2) The minimum probable invaliding-rate occurs among those who are +3 kg. to +6 kg. on entry.

This is interesting as bearing out the experience gained in the examination of pilots at the Central Medical Establishment, that a high degree of functional efficiency, as shown by the examination as a whole, is usually associated with a moderate degree of over-weight on entry.

In order to investigate the question whether different classes of disease were associated with different degrees of body-build on entry, all cases were divided up into infective diseases (148 cases), non-infective diseases (90), and psychic disorders (102).

The commonest form of infective disease was pulmonary tuberculosis (37), in which only 1 case was over-weight (+5 kg.) on entry. The most frequent diseases among the remainder were other chronic lung conditions exclusive of asthma (14), chronic otitis media (30), and rheumatic carditis (19). Fig. 8 shows that the ratio of under-weight to over-weight cases on entry among this class is 8 to 1.

The commonest causes of invaliding in the non-infective group were epilepsy (24), defects of vision (18), organic nervous disease (13), and gastric conditions (9). Fig. 9 shows that the proportion of under- to over-weights on entry was less than in Fig. 8—i.e., 5 to 1—but still more than twice as much as the normal proportion on entry (Fig. 1).

The remaining group of psychic disorders includes the psychoses and psychoneuroses (Fig. 10). This group is taken as illustrating the type of airman who would probably be incapable of withstanding severe or prolonged mental stress in that this type has already broken down under the minor stresses of peace-time. Here, too, the under-weight class shows a preponderance of 4½ to 1, less than in the other two groups but sufficient to suggest that the under-weight recruits as a class have less capacity to withstand mental stress than those whose body-build is above normal.

PILOTS

Invaliding figures from medical causes among pilots, almost entirely officers, comprise 147 cases. Fig. 2 showed that there was a preponderance of over-weight to under-weight cases on entry of roughly 5 to 4. Fig. 11 shows that among the invalids this ratio was practically 1 to 3. Comparison with the similar figures for airmen (Figs. 1 and 6) shows that

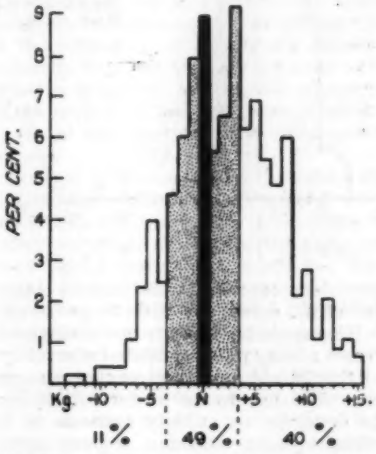

FIG. 4.—Body-build of 482 airmen in R.A.F. Athletic Championships in 1933. Average service five years.

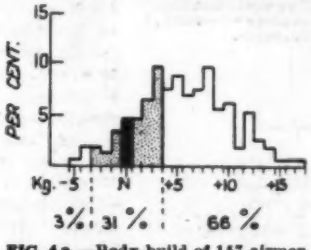

FIG. 4a.—Body-build of 157 airmen competing in tug-of-war teams.

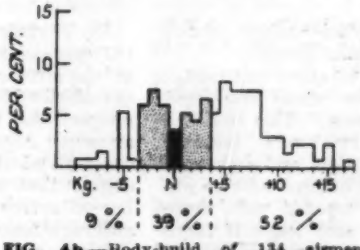

FIG. 4b.—Body-build of 134 airmen competing in field events.

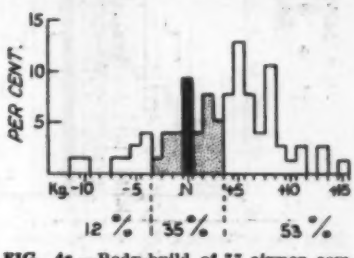

FIG. 4c.—Body-build of 77 airmen competing in sprint events.

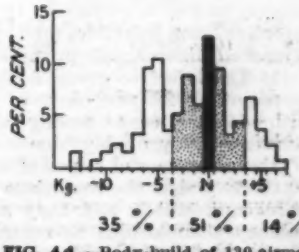

FIG. 4d.—Body-build of 130 airmen competing in long distance events.

the swing to the left is approximately the same among both pilot and airman invalids when their marked difference of body-build on entry is taken into account.

Analysis of the figures under the three heads of infective, non-infective, and psychic causes shows a marked difference from the airman group.

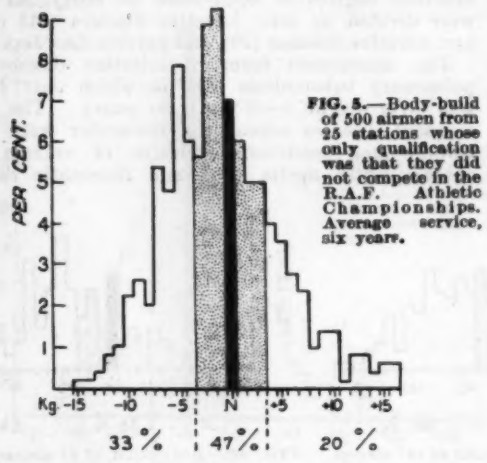

FIG. 5.—Body-build of 500 airmen from 25 stations whose only qualification was that they did not compete in the R.A.F. Athletic Championships. Average service, six years.

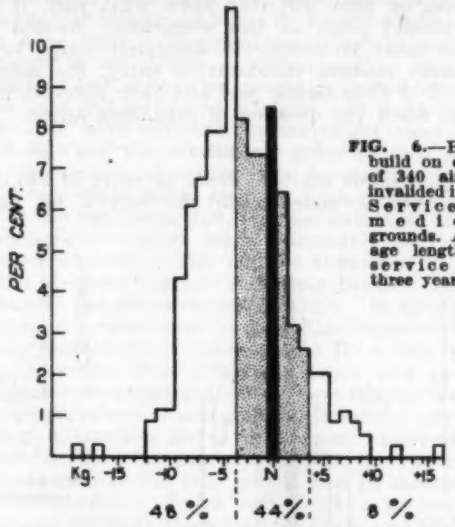

FIG. 6.—Body-build on entry of 340 airmen invalided in the Service on medical grounds. Average length of service was three years.

(1) The infective group is the smallest (32 cases), representing 22 per cent. of the whole compared with 44 per cent. among airmen. This marked difference is probably due to two main factors: (*a*) the more careful selection of pilots on entry, and (*b*) the fact that the conditions of officers' service are more comfortable, and they are treated with more leniency than airmen as regards sick leave if there are reasonable prospects of ultimate return to full duty and allowed a prolonged period of home service under such conditions.

(2) The non-infective group is a larger one (48 cases), equal to 33 per cent. of the whole, compared to 26 per cent. among airman invalids. Here again no comparison can be made, because more than half the cases among pilots were due to disabilities affecting only their efficiency as pilots, such as defective oculo-motor balance (31 per cent.) and air-sickness (20 per cent.). Neither of these is a cause of invaliding among airmen.

(3) Psychic disorders represent the largest class (67 cases), 45 per cent., compared with 30 per cent. among airmen. Here again the two are not analogous, as a third of the cases among pilots consisted of anxiety neurosis due to flying, a class not represented among airmen. A young pilot has to be fit for full flying duties, and if he develops an anxiety neurosis to a degree that medical opinion considers a permanent bar to active service flying, he is usually invalided, although many of such cases are quite fit for general service apart from flying. The psychoses represent a third of the total invalidings among airmen, but among pilots only 2 per cent. were invalided from this cause. This difference is probably due to the more searching examination of pilots on entry.

The question next arises to what extent individuals of one body-build group are liable to increase or decrease in weight beyond the normal amount that occurs with age. Reference to Fig. 1 (body-build of airmen on entry) and Fig. 5 (body-build of representative airmen in the Service) shows that the under-weight group has remained very much the same at 31 and 33 per cent. respectively, but that there is a slightly larger increase in the over-weight group, the original 15 rising to 20 per cent. A corresponding sample of 500 serving pilots also shows the largest increase in the over-weight group. Thus the percentage of under-weight pilots on entry was 22 per cent. (Fig. 2), and while serving 23 per cent. The percentage of over-weights, however, increased from 29 per cent. on entry to 38 per cent., twice as

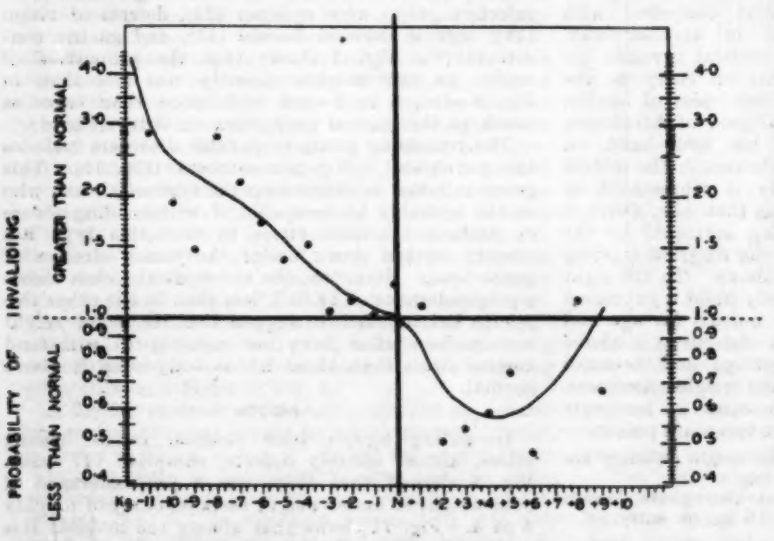

FIG. 7.—Showing ratio of probability of invaliding in airmen according to their body-build on entry to that in airmen of "correct" body-build.

much, in fact, as in the airmen. Finally, if the body-build of the R.A.F. athletes (Fig. 4) is compared with their own body-build on entry, we find that the percentage of over-weights has practically doubled (from 22 to 40 per cent.) and the percentage of under-weight cases has, unlike the other two groups in which it has remained much the same, undergone the marked diminution from 29 to 11 per cent.

This increasing tendency towards over-weight as one goes from the control-airman group to the pilot group, and finally to the athlete group, is probably due to the different amounts of physical exercise and training, both of which are well-known factors in weight production, in the three groups.

Alteration in the under-weight group is, in fact, almost confined to the athletes, among whom these factors would naturally play the major part. The liability of athletes to put on weight after training or, as the saying is, "turn their muscle into fat," is probably due to the continuance of the excellent appetite acquired as a result of continued exercise, when there is no longer any need for it. The natural result is the deposition of fat generally over the muscles.

It must not be assumed, however, that apart from athletes individuals under-weight on entry remain so or that the increasing percentage of over-weights during service is entirely at the expense of the normal body-build group. This is not so; there is a definite degree of interchange among all three groups, but it is rare to find members of the under-weight group becoming over-weight or vice versa.

The most stable of the three is the over-weight group. Among athletes, 86 per cent. of cases over-weight on entry remained so after five years' service; in the control-airman group, 80 per cent. after six years' service. None of the athlete over-weights became under-weight and only 5 per cent. of the airmen. The least stable of the three groups is the under-weight. Thus of the athletes under-weight on entry only 30 per cent. remained so, the balance becoming normal (62 per cent.) and over-weight (8 per cent.). Among the airman group, 48 per cent. remained under-weight and 8 per cent. changed to the over-weight group.

Approximately half of all airmen invalided from medical causes were −4 kg. or lighter on entry to the Service. This figure rises to 70 per cent. if all cases are taken whose body-build was −1 kg. or lighter (Fig. 6). It would appear on the face of it that the bulk of medical invaliding could be avoided by admitting into the Service only those recruits whose weight was "correct" or greater. In the first place, however, the material is not available, and in the second place it has been shown already that there is a definite percentage of under-weight individuals who are functionally efficient to a high degree. Consequently, the essential point is the differentiation at the time of entry of the under-weight who is functionally efficient and likely to remain so, from the under-weight who, even if passably fit on entry, is unlikely to stay so. This is a comparatively easy matter if attention is paid to the following points.

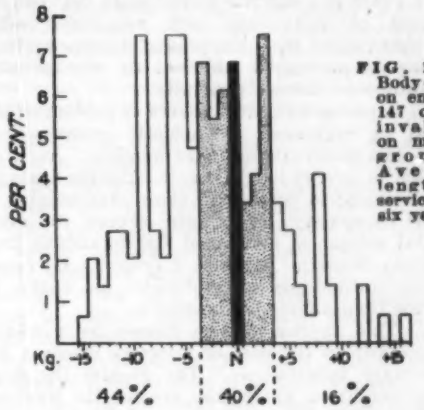

FIG. 11.—Body-build on entry of 147 officers invalided on medical grounds. Average length of service was six years.

It should be borne in mind that the typical under-weight is usually of poor physique, is not as a rule efficient in athletics, and tends to have a small heart and consequently tachycardia, and a narrow, poorly developed chest with a subnormal vital capacity. In addition, his family and personal history tends to reveal evidence of poor mental stamina, and his previous illnesses are usually more frequent and their duration longer than normal.

If, however, on examination a candidate, although under-weight, has a good games history, a pulse below 72—the lower the better, as indicating the possession of a heart whose output per beat is above average—a good vital capacity, and a clean family and personal medical history, little risk will be incurred in accepting him. Difficulty occurs in the under-weight cases between these two types, and the physical efficiency tests employed in the R.A.F. are particularly valuable in final assessment.

Under-weights, apart from the tuberculosis risk which occurs mainly below the age of 30, are viewed as a whole with greater favour than over-weight individuals by life insurance offices owing to their better expectation of life. This is probably due to the relatively sheltered lives they lead owing to their tendency to poor functional efficiency and also to their proneness as a class to arterial hypotension and consequent relative immunity to most of the cardiovascular catastrophes of later life. From the point of view of sickness insurance, however, the

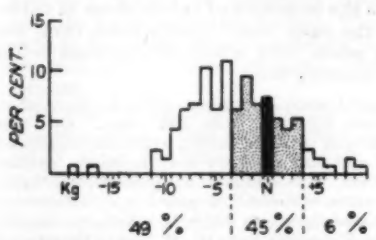

FIG. 8.—Body-build on entry of 145 airmen invalided on account of infective disease.

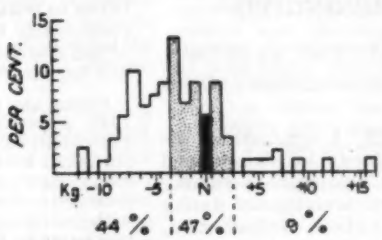

FIG. 9.—Body-build on entry of 90 airmen invalided on account of non-infective disease.

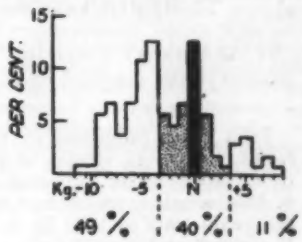

FIG. 10.—Body-build on entry of 102 airmen invalided on account of psychic disorders.

under-weight compared with the over-weight individual appears to be more undesirable owing to increased liability to disease.

CONCLUSIONS

(i) There is a definite relationship between varying degrees of body-build and functional efficiency, whether viewed from the points of capacity to endure severe or prolonged physical or mental stress or resistance to disease generally.

(ii) Capacity to endure severe or prolonged physical stress as evidenced by athletic prowess is found most commonly among over-weights. An exception to this is seen in long-distance athletes among whom under-weight is commoner than over-weight.

(iii) Incapacity to endure severe or prolonged mental stress, as evidenced by invaliding from the Service through psychic disorders, is commoner among individuals under-weight on entry to the Service than among over-weights.

(iv) This applies also to disease as a whole, and particularly in the case of infective diseases, such as pulmonary tuberculosis. The greater the degree of under-weight on entry, the greater the likelihood of invaliding from the Service on medical grounds.

(v) It is uncommon for over-weight individuals to become under-weight and vice versa.

(vi) As a general rule it is not difficult to distinguish between the "fit" and "unfit" types of under-weight by careful examination.

My cordial thanks are due to those of my brother medical officers of the Royal Air Force who have furnished many of the figures relating to airmen, and to Miss I. M. Marshall for her valuable assistance in the preparation of diagrams and figures.

INCIDENCE OF HUMAN AND BOVINE BACILLI IN TUBERCULOUS MENINGITIS

BY A. STANLEY GRIFFITH, M.D. Vict., Ph.D. Camb.
MEMBER OF THE SCIENTIFIC STAFF, MEDICAL RESEARCH COUNCIL

IN a paper published in 1932[1] I summarised the results of typing strains of tubercle bacilli obtained from 140 cases of tuberculous meningitis occurring in this country, which had been investigated during the years 1905 to 1931 by L. Cobbett, A. Eastwood, F. Griffith and myself.

The strains of tubercle bacilli were derived in 77 instances from post-mortem material and in 63 from cerebro-spinal fluid withdrawn during the life of the patient. In the first or necropsy series, which were mostly examined before 1914 and were to some extent selected, since search had been made for cases in which the portal of entry appeared to be the alimentary tract, the percentage of bovine infections was 19·5 (62 human and 15 bovine), while in the second or cerebro-spinal fluid series, collected mainly after the year 1920, the percentage bovine was 30·2 (44 human and 19 bovine). Thirty of the latter group were examined by me between March, 1930, and July, 1931, and of these 10 were bovine infections. Thus, it is seen that the percentage of bovine cases in the most recent series, in which there was no element of selection, was 33·3 or more than half as high again as in the first series, although as I have already mentioned the latter were specially selected on account of their supposed alimentary origin. The cases in the two series were not, however, obtained from the same part of the country, those in the first having been derived mainly from hospitals in London, whereas those in the second came from other and widely separated localities, including country districts, in England. For this reason one could not decide whether the higher bovine percentage in the recent series signified an increase of late years in the relative frequency of bovine infections in tuberculous meningitis, or was referable merely to the different provenance of the cases.

In order to clear up these points it was necessary to undertake further investigations. The inquiry was therefore continued with the object of ascertaining the relative incidence of the human and bovine types in tuberculous meningitis in various parts of England and Scotland.

Nature and Source of Material

The material used in the investigation was principally cerebro-spinal fluid withdrawn by lumbar puncture during the life of the patient. In a few cases of tuberculous meningitis material from autopsies was investigated in addition to spinal fluid, and in eight cases post-mortem material only was used.

The use of cerebro-spinal fluid as original material, as I have previously pointed out (loc. cit.), has a special value from the statistical point of view. In the first place a far greater number of cases of tuberculous meningitis occurring in a locality can be examined than if one depended on material from autopsies, which moreover would not give a fair sample. In the second place the typing of strains of tubercle bacilli from cerebro-spinal fluid gives some indication of the extent to which at present the general population is being infected with bovine bacilli, since tuberculous meningitis occurs mainly in young children and in them supervenes comparatively closely on infection.

Determination of the types of tubercle bacilli in tuberculous meningitis would be of great value to health authorities in yet another way, as K. A. Jensen [2] has also suggested. If periodical investigations of all cases occurring in selected areas over certain periods were made, the data so obtained would enable one to estimate the effectiveness of measures taken to reduce the incidence of tuberculosis in cattle, particularly if the cases came mainly from rural and urban districts where milk is not heat-treated before sale for direct consumption.

During the period from December, 1931, to December, 1933, material was received from 204 cases. Of these 188 yielded cultures of tubercle bacilli, while the remainder (15 spinal fluids and one autopsy) were negative, neither direct cultures nor tuberculosis in guinea-pigs being produced. The cultures were all obtained in my laboratory with the exception of those (see Table I.) which were kindly sent to me by Drs. F. Griffith and W. M. Scott (Ministry of Health), and Dr. W. T. Munro (Glenlomond Sanatorium).

In each of 16 cases the material received was an uncut inguinal gland of a guinea-pig which had been inoculated subcutaneously with spinal fluid; for these I am indebted to Drs. Constant Ponder and J. Menton, bacteriologists to the Kent and Stafford county councils respectively.

The cases of tuberculous meningitis were derived from the following places in England and Scotland: Kent, Bristol, Gloucester, Wolverhampton, Stafford, Sheffield, Manchester, Liverpool, Leeds and the West Riding, Hull, Newcastle-upon-Tyne, Ayr, Dundee, and Aberdeen. To the medical officers of health of the cities, towns, and county councils, and to various physicians and bacteriologists who have aided me in this inquiry, I wish to express my grateful thanks.

Methods of Examination and Results

Each specimen of cerebro-spinal fluid was injected subcutaneously into one or two guinea-pigs, and at least one strain of tubercle bacilli from each case was obtained either through the guinea-pig or directly from the original material. The guinea-pigs were

killed in from 18 to 42 days and cultures were invariably made from the glands adjacent to the seat of inoculation. Where two guinea-pigs had been inoculated the second was held in reserve in case the first attempt at culture failed or, when necessary, for confirmation of the first result. In 38 out of 58 cases cultures were also obtained directly from the cerebro-spinal fluid, the undiluted fluid or centrifuged deposits being sown after treatment with potassium hydrate (2·5 per cent. in the mixture) or sulphuric acid (3 per cent.). The number of colonies obtained in direct cultures varied from one to numerous. In two cases cultures were obtained both from the cerebro-spinal fluid and from post-mortem material, and in eight cases from post-mortem material only.

The total number of strains from the 188 cases was 237, of which 222 were derived from cerebro-spinal fluid (38 direct and 184 through the guinea-pig) and 15 from post-mortem material. In every instance where two or more strains from a single case were examined these proved to be identical in cultural characters and, where this was tested, identical also in virulence.

The primary cultures were made both on plain egg and on 5 per cent. glycerin egg. The characters of the colonies of tubercle bacilli on these two media enable one, as I first pointed out in 1914,[3] to decide in almost every case, and generally within four weeks, to which type (human or bovine) a strain of tubercle bacilli belongs. (The avian bacillus can also be distinguished in primary cultures but has never been found in human tuberculous lesions in Great Britain.) All the strains in this series were either human or bovine. As the cultural differences between human and bovine tubercle bacilli are well known it is unnecessary to give a detailed description of the cultural characters of the various strains obtained, and I shall merely state how many were human and how many bovine. With regard however to those strains of human type, which were not tested as to their virulence, I may mention that no strain was classified as "eugonic human" unless it produced abundant wrinkled growths on glycerinated potato, which in my experience is the most reliable medium for differentiating eugonic human from dysgonic human and bovine strains.

Of the 188 cases of meningitis 140 yielded eugonic human strains. Five only of these strains were tested as to their virulence, one rabbit being inoculated subcutaneously with each, the doses ranging from 20 to 50 mg. The five rabbits were killed 90 to 182 days after inoculation and in two the lesions were limited to the seats of inoculation, while in three there were in addition to local abscesses a few small lesions in the lungs and in one a slightly enlarged purulent scapular gland.

The remaining 48 cases yielded cultures with the cultural characters of the bovine type of tubercle bacillus. All these strains were tested as to their virulence for the rabbit by the subcutaneous or the intravenous inoculation of culture. The test suspensions of culture for subcutaneous inoculation were prepared by a simpler method than in previous investigations.

Instead of subculturing a strain for several generations and giving weighed amounts of culture I took either primary egg cultures from three to four weeks old, or first subcultures on egg four to six days old, the latter being made by spreading over the surface of each tube a drop of an emulsion of a primary culture. It was found that an average tube thus sown and incubated for from 5 to 6 days yields when scraped about 1·0 mg. of culture. The suspensions for inoculation were prepared directly in the culture tubes by rubbing off the growths with a spatulated platinum wire and suspending them in physiological salt solution; young cultures of bovine bacilli readily form homogeneous suspensions. From one to five tubes were used, the larger number only when the primary cultures showed not very numerous colonies. The doses therefore varied but never exceeded 10·0 mg. which was the standard dose in previous investigations, and ranged usually from about 1·0 to 5·0 mg. As will be seen, although the doses were generally much less than 10·0 mg., the duration of life of the rabbits and the severity of the disease produced showed much the same range of variation as in previous series where the dose was always 10·0 mg.

Altogether 50 dysgonic strains from 48 cases of tuberculous meningitis were tested on rabbits, six of them intravenously* and the rest subcutaneously. All the strains proved highly virulent for the rabbit, producing severe general tuberculosis identical with that which follows similar inoculation of bovine tubercle bacilli of direct bovine origin. With three strains the tests had to be repeated because the rabbits, inoculated subcutaneously, died in 19, 20, and 23 days, and the tuberculosis though generalised was insufficient to account for death. The subsequent tests showed these strains to be fully virulent.

Excluding the three rabbits dying prematurely and two others which survived 101 and 105 days there are 47 subcutaneously inoculated rabbits which died of general tuberculosis in from 28 to 95 days, the average duration of life being 52·3 days. The rabbits which died in 101 and 105 days had been given small doses—namely, one primary culture each; the tuberculosis produced however was severe and typical. The six rabbits injected intravenously died of general miliary tuberculosis in from 23 to 53 days.

Another dysgonic strain obtained in the course of this investigation, from a woman of 27 who had had no illness previous to the meningitis, has had to be omitted because its type has not yet been definitely ascertained. This strain was tested subcutaneously on a rabbit, the growth from one primary culture being inoculated. The rabbit was killed 108 days later, having nearly doubled its weight, and was found to have a local lesion and a few foci in the lungs only. The virulence test was repeated and two rabbits were inoculated intravenously, doses 0·01 and 0·1 mg. These were killed 71 and 49 days later and found to have slight general tuberculosis. These experiments showed that the strain though resembling dysgonic bovine bacilli in cultural characters had no greater virulence for the rabbit than human tubercle bacilli. In order to decide whether the strain was an attenuated bovine strain or a very unusual dysgonic form of the human group of bacilli further tests of virulence were necessary. These have been made on rabbits and guinea-pigs but are not yet completed.

Sources of Infection

Inquiries were made into the milk-supply in the majority of the bovine cases of meningitis with the object of tracing the source of the bovine bacilli. Such inquiries could be expected to be fruitful only in cases where the interval between tuberculous infection and the occurrence of tuberculous meningitis was comparatively short, as it often is in quite young children. Where tuberculous meningitis due to bovine bacilli supervenes in the course of chronic tuberculosis it is too late to investigate the milk-supply. In a few instances the inquiries led to the discovery of cows giving tuberculous milk and to their slaughter earlier than otherwise would have been the case, but they mostly had negative results, the veterinary inspectors failing to find, or to obtain a history of a clinical case of tuberculosis in the herds supplying the milk.

* By Dr. W. T. Munro.

The following are examples of the results of the inquiries. At one farm the cows were inspected and appeared healthy but a group sample of the milk, taken immediately after the inspection, was shown by the guinea-pig test to contain tubercle bacilli. The farm was visited again and after a more thorough examination of the cows one suspicious animal was picked out. A sample of her milk was taken and was found to contain tubercle bacilli. The cow was then slaughtered and showed extensive tuberculosis.

Of the inquiries which were inconclusive as regards the source of infection the following may be quoted.

Two children, 15 months and 2 years of age respectively, from different households in the same street and receiving milk from the same producer-retailer, died within about six months of each other of tuberculous meningitis due to bovine bacilli. A bulk sample of this man's milk was tested and gave a negative result. Sufficient time however had elapsed before the taking of the sample for a doubtful cow to have been removed from the herd. In this instance I asked the medical officer of health (Kent) if other cases had occurred which could be attributed to this retailer's milk and he informed me that there was one child suffering from abdominal tuberculosis. In another instance a boy of 3 years died of tuberculous meningitis due to bovine bacilli and an infant of 11 months (not investigated) who had been supplied with milk from the same source was suffering from tuberculous peritonitis. The conditions on this farm (in Kent) were most unsatisfactory, though none of the cows appeared to be giving tuberculous milk. The farmer of course had been notified that his herd was to be inspected and had had ample time to dispose of any animal which he did not wish the veterinary surgeon to see.

In one case, a child of 6 years, infected with bovine bacilli, the autopsy (performed by Dr. S. C. Dyke, Wolverhampton) showed no lesions in the mesenteric or the tracheo-bronchial glands. The lungs, however, were extensively tuberculous and cultures of bovine bacilli were obtained from them as well as from the spleen and the meninges. The father of the child was said to have pulmonary tuberculosis, but a specimen of his sputum could not be obtained. With regard to the portal of entry of the bacilli in this case, it is uncertain whether the infection was through milk or transmitted from the father.

In all other cases with a family history of tuberculosis the bacilli causing the meningitis were found to be of the human type. Two of these cases were sister and brother, aged 2½ and 4½ years, and they died within two months of each other. Their mother suffered from pulmonary tuberculosis and was discharging tubercle bacilli in her sputum.

Distribution of Lesions found at Autopsy

The post-mortem notes of 33 of the cases investigated have been sent to me and are summarised as follows. The tubercle bacilli responsible were of the human type in 21 and of the bovine type in 12 cases.

Of the 21 cases due to human tubercle bacilli 15 showed older and more extensive tuberculous changes in the tracheo-bronchial than in the other regionary lymphatic glands, indicating infection by way of the respiratory tract, while of the remaining six the channel of infection was uncertain in four and probably alimentary in two.

In eight of the first group of 15 cases the lungs contained in each instance, besides miliary tubercles, a caseous nodule or mass, which was considered to represent the primary lesion, and in seven no primary lung focus was found. Of the six cases in the second group, in two the regional lymphatic glands were not examined and in two both the thoracic and abdominal regionary lymphatic glands contained lesions. In a fifth case, one of general miliary tuberculosis, careful search by Dr. A. D. Fraser (Bristol Royal Infirmary) failed to reveal any disease in the tracheo-bronchial or abdominal glands, or any primary focus in the lungs. Instances of acute general miliary tuberculosis without macroscopic lesions to mark the portals of entry of the bacilli have been recorded occasionally. A. Eastwood and F. Griffith [4] reported a case of tuberculous meningitis (due to bovine bacilli) without macroscopic primary focus, and J. C. Hendrie [5] has recently reported two cases. The sixth case was remarkable for the occurrence of extremely numerous large tubercles on the parietal and visceral surfaces of both peritoneum and pleura. No tubercles were seen in the substance either of the lungs, spleen, or kidneys. The mesenteric glands were enlarged and congested, though not caseous, and the late Dr. Egerton Williams (Sheffield) thought that the infection was probably of alimentary origin.

Of the 12 bovine cases eight were straightforward instances of alimentary tuberculosis, the channel of infection being the intestinal canal. Six of the eight cases were in children 22 months, and 2, 4, 4, 4, and 6 years of age and two were in adolescents, one female and one male, both 18 years of age. In the children the mesenteric or the ileocæcal glands were extensively caseous. No intestinal ulcers were found, but the Peyer's patches in the upper ileum of one child were hyperplasic. In two of the cases there were miliary tubercles in the lungs, liver, and spleen, while in four miliary tubercles were not seen in the abdominal or the thoracic organs; in three cases the peritoneum showed miliary tubercles, in one case profuse. In none of these six cases were lesions reported in the tracheo-bronchial glands.

In the young woman the mesenteric glands were completely calcified and the lungs were closely beset with miliary caseous tubercles. At the base of the brain there were two or three small caseous nodules in addition to miliary tubercles. The youth had suffered from tuberculosis of the cervical glands in 1930, and in 1933 was treated for enlarged glands in the groin; the axillary glands were also enlarged. In December, 1933, he was notified as a case of tuberculous meningitis. At the autopsy (by Dr. M. Scott, R.M.O., Heathfield Hospital, Ayr) the lungs were found to be very adherent on both sides and extensively infiltrated with tuberculosis of a broncho-pneumonic type without cavitation or evidence of older disease. Both kidneys showed much fibrocaseous infiltration with nodules of walnut size. There was definite tuberculous meningitis with a gelatinous exudate over the base of the brain. The mesenteric glands were extensively implicated and showed partial caseation.

In the remaining four bovine cases the distribution of the lesions was unusual.

In one case, a girl of 9 years, there was general miliary tuberculosis, the lungs being closely and the kidneys sparsely beset with macroscopic tubercles, while in the liver and spleen the foci were microscopic. No lesions were found in the regional lymphatic glands, but debris suggesting diseased bone was extracted from the upper nasal area and Dr. T. B. Davie thought that this might have been the primary seat of the disease, the meninges becoming involved through the cribriform plate.

In the second case, previously mentioned, there was general tuberculosis of the lungs but no disease of the tracheo-bronchial or mesenteric glands.

In the third case, a boy of 2½ years, Dr. A. D. Fraser found caseous tuberculous glands at the hilum of the right lung, typical tuberculous meningitis, and no sign of tuberculosis elsewhere. Dr. Middleton Martin caused inquiries to be made into the family history and the milk-supply of this case. No history of tuberculosis in the parents or attendants could be elicited, but it was

ascertained that the child had been supplied with milk from a tuberculous cow.

In the fourth case, a girl of 9 years, the left prætracheo-bronchial glands contained calcified and caseous material and one intertracheo-bronchial a well-encapsulated calcareous focus. There were no lesions elsewhere except on the meninges.

Thus in two "bovine" cases the oldest tuberculous lesions were seated in the tracheo-bronchial glands, and apart from tuberculosis of the central nervous system no lesions were noted in any other part of the body. Cases of this kind, where the tuberculous infection is bovine and apparently primary in the thorax, have been reported from time to time but they are rare. The first case was recorded by me in 1920.[6] Munro [7] reported three cases in 1932. Blacklock [8] described three cases, occurring among 183 autopsies, in children aged 9 months, 18 months, and 2½ years. In these the tracheo-bronchial glands (two cases) or a paratracheal (one case) were extensively caseous but no primary pulmonary lesions were found. The three children died of general miliary tuberculosis and tuberculous meningitis.

In view of the fact that phthisis pulmonalis due to bovine bacilli is by no means rare in this country (in the last ten years or so Cumming, Munro, and Griffith have found upwards of 80 instances), it is possible that these children or some of them may have been infected with bovine bacilli from human sources.

Tuberculomata of the central nervous system were recorded in two cases only.

In one autopsy there were two cerebellar nodules, one of which was presenting on the surface. In the other there were soft caseous nodules on the meninges. In three instances it was stated that no tuberculomata were found on section of the brain. In the remainder typical meningitis only was described. It is probable that the majority of the brains were examined merely to establish the presence of tubercles on the meninges and thorough search was not made for older tuberculous foci in some part of the central nervous system or its bony surroundings. The absence of record of associated tuberculomata is not necessarily opposed to the conclusion of Rich and McCordock,[9] who believe that tuberculous meningitis can only be produced by direct extension from a pre-existing lesion in the cortex of the brain, the meninges, or the bones of the skull or the vertebræ. My experiments on animals and observations in the human subject support this view of the pathogenesis of tuberculous meningitis.

In seven of the present series of cases there were no miliary tubercles anywhere except on the meninges, the primary seats of the disease in three instances being the mesenteric glands and in four the tracheo-bronchial glands, which were enlarged and caseating. As there were no miliary tubercles elsewhere in these cases the tubercles on the meninges could not have been produced by blood-borne bacilli and must, I think, have been the result of extension of the tuberculous infection from an undiscovered focus in close relationship to the meninges.

Another case for which I think the same explanation holds good was in a boy of 4½ years, who died of tuberculous meningitis and showed at autopsy a few miliary tubercles in the liver and spleen and a single caseous slightly calcareous mesenteric gland. Dr. Nabarro sent me the gland and on microscopical examination I found numerous short acid-fast bacilli which suggested bovine infection. An emulsion of the gland however did not produce tuberculosis in guinea-pigs and direct cultures remained sterile; the bacilli were dead. In this case therefore the meningitis could not have been the result of a sudden discharge into the general circulation of large numbers of bacilli from the caseous gland.

Regional Distribution of Bovine Cases

Table I. gives the different localities contributing material, the number of cases from each locality, and the proportion of human and bovine infections in each group. With the exception of Newcastle-upon-Tyne and two counties which sent 1 and 3 cases only every locality has yielded one or more bovine cases. The absence of a bovine case in the Newcastle series is probably attributable to the small number of specimens submitted for examination and to the predominance of persons in the higher age categories (8 of the 13 were over 8 years of age); moreover all but one of the patients were resident in the city. The evidence of widespread infection of human beings with bovine bacilli in England and Scotland furnished by this inquiry is corroborated by recent bacteriological investigations of other forms of human tuberculosis—namely, cervical gland, bone and joint, and genito-urinary tuberculosis, in which high bovine percentages have been found. Reports of these investigations are in preparation.

TABLE I

Proportion of Human and Bovine Infections in Different Localities *

Locality.	Sender.	Cases.	Human.	Bovine and per cent.
Aberdeen ..	Dr. J. Smith.	15	8	7 (47)
Dundee ..	Dr. W. T. Munro.	12	8	4 (33)
Fifeshire ..	,, ,,	6	4	2 (33)
Ayr	Dr. J. Grant.	4	2	2 (50)
Newcastle-upon-Tyne ..	Various hospitals.	13	13	0
Leeds ..	Dr. W. Vining.	66	48	18 (27)
{ *City* ..		*49*	*39*	*10 (20)* }
{ *Rural* ..		*17*	*9*	*8 (47)* }
Hull	Various hospitals.	4	3	1 (25)
Sheffield ..	Dr. E. Williams.	9	6	3 (33)
Manchester ..	Dr. G. D. Dawson.	14	12	2 (14)
Liverpool ..	Drs. W. E. Crosbie and C. Rundle.	10	8	2 (20)
Lancs (rural) ..	Ministry of Health.	1	0	1
Staffordshire ..	Dr. J. Menton.	5	2	3 (60)
Wolverhampton	Dr. S. C. Dyke.	9	8	1 (11)
Bristol	Dr. A. D. Fraser.	5	4	1 (20)
Gloucestershire.	Dr. E. N. Davey.	3	3	0
Kent	Drs. Greenwood and Constant Ponder.	35	26	9 (26)
Lincs (rural) ..	Ministry of Health.	1	0	1
Cornwall ..	,, ,,	1	1	0
London ..	Dr. D. Nabarro.	5	4	1
		218	160	58

* Including the 30 reported in 1932.

As will be seen from Table I. the proportional frequencies of bovine infections in tuberculous meningitis are in general higher in Scotland than in England.

The cases from Fifeshire and Dundee were examined by Dr. W. T. Munro, to whom I am much indebted for cultures of the bovine strains and for allowing me to include the results he has obtained down to October, 1933. The Aberdeen cases included three in persons who were not residents of the city. One, a youth of 15, was a native of the Orkney Islands; the type of bacillus in his case was the bovine. One of the patients came from the Shetland Islands and one from Elgin; these were both human infections. The remaining 12 cases were residents of Aberdeen and of these six were due to human and six to bovine bacilli. The four Ayrshire cases were in persons ranging in age from 16 to 22 years.

The total number of Scottish cases examined is 37, of which 15, or 40·5 per cent., were caused by bovine bacilli. In England 214 cases (151 recent and 63†

† Only 30 of these included in Table I.

from earlier series) have now been examined and of these 52, or 24·3 per cent., were bovine infections. Tuberculous meningitis in Scotland thus falls into line with all the other forms of human tuberculosis in showing a higher bovine percentage than the respective forms of the disease in England.

While in Scotland the bovine percentages for the different localities were high and showed little variation, in England they have varied widely, from 0·0 per cent. in Newcastle-upon-Tyne to 60·0 per cent. in Staffordshire. The figures for the cities and towns must not however be taken to represent the actual proportional incidence of bovine infections on the inhabitants of these places. On ascertaining the home addresses of the patients it was found that many were not residents, having been sent into the city hospitals from neighbouring small towns or villages, or from the outskirts of the cities, and that these rural or suburban cases were due in higher proportion to bovine bacilli than were the city cases.

The bovine case from Hull was in a child of 6 years, who until a few weeks before death had lived in a village in the East Riding of Yorkshire where his father worked on a farm.

One of the Sheffield bovine cases came from the neighbouring town of Chesterfield. The Liverpool and Manchester cases were from the suburban districts of these cities. Of the Manchester cases one, a child of two, had been fed on raw milk. The milk of the producer-retailer who supplied the household had been tested three months previous to the death of the child and found to contain tubercle bacilli. The second case from Manchester was a girl of 18 years. The tuberculosis in this case was of some standing, the mesenteric glands showing calcified lesions. The Bristol case was from a village in Gloucestershire and is one of the two referred to under autopsies in which the oldest and only glandular lesions were in the thorax. The London case was in a child aged 22 months, who had been sent in for treatment from a small town in Essex.

The 66 Leeds cases (1930 to 1933), for which I am greatly indebted to Dr. Wilfred Vining (professor of children's diseases, University of Leeds) and to his various house physicians, are subdivided in Table I. into city and country cases, the latter coming from small towns and villages in the West Riding of Yorkshire. Of the 49 residents 39 were infected with human and 10 with bovine bacilli. Of the 17 cases in non-residents nine were due to human and eight to bovine bacilli. In one of the latter cases, the source of the bovine bacilli could not be traced in the West Riding and it was thought that the child was infected on a visit to Wallsend, near Newcastle-upon Tyne. Assuming this to have been so the percentage of bovine infections for the country districts of the West Riding is 43·75.

The cases from the country districts of Kent have also yielded a high proportion of bovine infections. Through the courtesy and kind coöperation of Dr. A. Greenwood and Dr. Constant Ponder I have been able to examine 35 cases of tuberculous meningitis from Kent. Of these, two were in persons who were not residents of the county. Omitting these two there are left 33 cases of which nine, or 27·3 per cent., were due to bovine bacilli. Twenty-four of the persons were under 16 and of these eight, or 33·3 per cent., were bovine infections. At one stage of the inquiry (in 1932) the percentage of bovine infections in Kent children was 50, but a sequence of cases due to human tubercle bacilli towards the end of 1933 has reduced it to 33·3.

From the country and small urban districts of North Staffordshire five cases have been examined and here also the proportion of bovine infections was high. Of the five cases three were due to bovine and two to human bacilli. The persons infected with bovine bacilli were two children aged 19 months and 2 years and a woman of 22. The woman lived on a farm where there were tuberculous cows and the first of the two children had been supplied with milk from a source from which a positive sample had been taken four months previously.

Age and Sex Frequency

For the purposes of this section the 63 cases previously reported are included. There are thus 251 cases available for statistical analysis.

Sex.—The sexes of the patients were given in 247 cases. Of this number 131 were males and 116 were females. The males were preponderant in the first five years of life and in adult age. In the age-period 5–14 years the females equalled the males. In adolescence the females exceeded the males. Of the males 38 (29·0 per cent.) and of the females 28 (24·1 per cent.) were infected with bovine bacilli.

Age.—In Table II. the cases have been analysed to show the relative frequency of human and bovine infections in each of the first seven years of life and at age-periods 0 to 4, 5 to 14, 15 to 24, 25 and over, and at all ages. The ages of two cases in an earlier series were not recorded. These cases, infected with human bacilli, are included in the all ages group only.

TABLE II

Age-incidence of Human and Bovine Infections
English and Scottish figures combined

Age-periods.	Cases.	Human.	Bovine and per cent.
0–1 years ..	20	17	3 (15)
1–2 ,, ..	25	15	10 (40)
2–3 ,, ..	24	13	11 (46)
3–4 ,, ..	26	20	6 (23)
4–5 ,, ..	20	14	6 (30)
5–6 ,, ..	20	14	6 (30)
6–7 ,, ..	10	4	6 (60)
7–14 years ..	56	48	8 (14)
15–24 ,, ..	38	28	10 (26)
25 and over ..	10	9	1 (10)
0–4 years ..	115	79	36 (31)
5–14 ,, ..	86	66	20 (23)
15–24 ,, ..	38	28	10 (26)
25 and over ..	10	9	1 (10)
Total ..	251*	184*	67

* Including two cases age not stated.

In the first year of life the percentage of bovine infections is comparatively low—namely, 15·0—probably because unheated cow's milk is not usually given to babies. After one year the percentage bovine rises sharply to 40·0 in the second and 45·8 in the third year. In these years cow's milk is frequently consumed in the raw state. In the fourth year the percentage falls to 23·1, or about half what it was in the third year, and in the fifth and sixth years rises slightly. The high percentage figure in the seventh year may be fortuitous, as it is based on a small number of cases. In late childhood (7–14) the percentage incidence falls to 14·3 and rises again during the period of adolescence. The adolescent figure 26·3 is nearly as high as that—namely, 27·3—for the ages 3 to 5.

The infection in two of the adolescent cases was evidently acquired several years before the fatal issue and it is probable that a high proportion of the older children and adolescents were infected in early childhood.

Summary

1. The results are given of typing the strains of tubercle bacilli obtained from a new series of 188 cases of tuberculous meningitis collected during the period from December, 1931, to December, 1933.

2. Of this number 48 (25·5 per cent.) were due to bovine bacilli and 140 (74·5 per cent.) to human bacilli.

3. The cases were derived from widely separated localities in England and Scotland. The number of English cases was 151, of which 33 (21·8 per cent.) were bovine infections. The number of Scottish cases was 37; of these, 15 (40·5 per cent.) were due to bovine bacilli.

4. Including the 63 cases previously reported the total number of English cases investigated is now 214. Of these, 52 (24·3 per cent.) were caused by bovine bacilli and 162 by human bacilli.

5. The percentages of bovine infections at different age-periods (English and Scottish figures combined) are as follows: 0 to 4 years: *31·3*; 5 to 14 years: *23·3*; 15 to 24 years: *26·3*; and 25 years and over: *10·0*.

6. The bovine cases were widely distributed and varied greatly in proportional frequency in different localities, country places and small towns, in general, giving higher percentages than the cities.

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PELLAGRA IN SUDANESE MILLET-EATERS

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SUDAN MEDICAL SERVICE

In May, 1933, I encountered symptoms unfamiliar to me in a desert community of Arabs at Abu Deleig in the Butana Desert of the northern Anglo-Egyptian Sudan. It was apparent that these people were suffering from a considerable degree of avitaminosis. In June 103 members of the tribe were examined, their medical histories were recorded, and their individual diets were assessed.

It became obvious that the community was pellagrous and it appeared that most of its members were in a state of disease, proclaimed by certain physical signs, suggesting that the pellagrous process has a phase preceding subjective manifestations, a phase of activity in which such manifestations dominate the picture, and a post-active phase in which a measure of more or less toleration to the process has been evolved. The staple diet was found to be millet. W. H. Wilson (1921) has recorded pellagra in millet-eaters in Egypt and two cases have been recorded from the Sudan in an annual report of the Sudan Medical Service (1929). In the past it has been usual to ascribe the "absence" of pellagra from the Sudan as due to the millet diet of its inhabitants as compared with the maize diet of most Egyptians.

I use the term pellagra in reference to the symptom-complex which is commonly found associated with the dermatitis which has itself occasioned the more classical conception of pellagra as a predominantly skin affection. In this I follow the guidance of Manson-Bahr (1925). Last November, through the kindness of Dr. D. Riding, of the Public Health Department, Cairo, I was introduced to Dr. H. W. Dudgeon and Emeritus Prof. W. H. Wilson, who very kindly demonstrated a series of male and female pellagrin inmates of the asylums at Abbasia and Khanka near Cairo. The same fundamental process was found in the pale maize-eating Egyptians as in the darker millet-eating Sudanese, but in the former the skin symptoms were severer and no blue or black patches on their gums or tongues were to be found.

For the purposes of my inquiry the 103 individuals were divided into four clinical groups: those with severe active pellagra (all women), those with less severe active pellagra (all men), those with what I considered to be latent pellagra (all men), and those whose condition would not have suggested pellagra if divorced from the circumstances (all boys). A fairly strict purdah tradition prevented my seeing any young girls. The groups of men were then pooled and re-analysed into three new groups according to whether they drank milk daily, less than daily in the average week, or not at all in the average week. The percentage incidence of active pellagra was then estimated for each of these milk consumption groups. Lastly, data relating to cases of mental disorder in males and females of the affected tribe were collected.

The present paper gives a summary of the findings and an outline of the views based on them. A more complete account of the observations will be published later.

FINDINGS

Certain physical signs were common to most adults of the community but were more pronounced and more frequently found in multiple association in those with subjective symptoms and considered to be suffering from active pellagra.

These signs were "sulphur-flake" sebaceous dysfunction on the forehead, wings of the nose, cheeks, and chin; a stomatitis characterised by the pronounced impression, as if in wax, of the lateral aspects of the closed rows of teeth on the mucous membranes of the cheeks (hereafter called the buccal frieze*); glossitis of various forms (fissures, rawness, blueness, blue, black, or dark red patchiness, and in very many a stippling at the tongue margins in blue, black, or dark red); blueness or blackness of the gums in patches or to complete involvement; and in certain subjects a deepening of the natural pigmentation on the forehead and cheeks.

The commonest subjective symptom was a burning pain in the hands, feet, head, and interscapular region. This pain came at night or on going into the shade after being in the sun. It came daily in the hot dry season "when the sun went down." In the rainy season it disappeared. Some subjects got it at seasons other than the hot dry season if they "worked hard," "rode a camel," or "got tired." It was often associated with "swelling of the skin" followed by desquamation. Other common symptoms were a gnawing or "hot" pain in the epigastrium (as characteristically present as the burning pain in the extremities, both generally being present together), weakness, wasting, flatulence (very common), vomiting, diarrhœa (often bloody), joint pains, lumbago, formication, vertigo, sleep dysfunction, and mental disorder.

Certain cases of asthma, paroxysmal rhinorrhœa and dietetic intolerance, and such histories as that of a pellagrin who said that always after a shower of rain for about half an hour "the skin of all his body felt swollen," suggested an allergic factor.†

* I have noted a similar appearance in a much lesser degree in Europeans, Hamites, Semites, and Negroids, in all of whom pellagra could not be said to be obviously present. Is it a sign of vitamin-A deficiency?

† I subsequently carried out a series of skin tests on pellagrins and found that in most of them the condition of factitious urticaria was easily occasioned, and further, that they were sensitive to coffee solution and whole-millet. These investigations will be described elsewhere.

Variable knee-jerks and spinal tenderness suggested the clinical entity of subacute combined degeneration. The mental cases comprised maniacs and melancholiacs, mostly the latter. In a high proportion of them there was amelioration in the rainy season and recurrence or exacerbation in the hot dry season. Among 13 female cases 7 (of whom 5 were brides) committed suicide. Among 14 male cases 1 had committed suicide and 3 had attempted to do so. The more severe the pellagra the less was the incidence of dental caries. It is therefore of interest to note that the teeth of the modern Egyptians are proverbially good; it has been claimed that most of them are pellagrins.

Of interest, but less commonly noted, were: deprivation or abstinence symptoms relating to coffee and millet, tenderness of the calves without œdema or cardiac dysfunction, tongue tremor, stammering, night-blindness, ptosis, and various urinary affections of an undetermined nature. Eye affections existed but no diagnostic attention was paid to them owing to lack of time.

Statistically and clinically, women were found to be more severely affected. The disease occurred in the first decade, was most common in the third decade in both sexes, and became in a proportion of male cases later in life more or less quiescent or inactive. Occupation was a factor inasmuch as it governs insolation and accessibility of the milk-supply. Insolation daily was estimated for each person examined and, although exposure to the sun was associated with dermatitis and the burning pain which came on in the shade or darkness after exposure, yet the group with severest pellagra—the women—averaged only 1·7 hours exposure daily as compared with 6·7 and 7·0 in the male groups, the less severely pellagrous The first group, incidentally, may be presumed to have photosynthesised vitamin D to a much lesser degree than the two male groups. Certain pellagrous manifestations appear to have been activated from latency by katabolic acceleration in the form of "fatigue"—i.e., exercise or labour, malaria, and viperine poisoning.

The hot dry season was the period of maximum occurrence, recurrence, and exacerbation of symptoms.

There were found to be, also, significant curves on a graph on which were plotted the quarterly figures for deaths and conceptions (antedated births). There was a peak of deaths in the rainy season which immediately follows the hot dry season, the period of maximum pellagra activation. This is interpreted as showing that a pellagrous community after its seasonal affliction is especially susceptible to the infective diseases associated with the rainy season, the period of maximum microbic and insect activity. A very marked depression in the conception curve was present in the hot dry season, and as it cannot have been due to vitamin-E lack, for the amount of millet consumed if anything increases in this season, it must be ascribable either to vitamin-A lack or to the essential pellagrous process.

As extremes of cold and humidity, as well as sudden changes of temperature and humidity, also occasioned pellagrous manifestations (cf. activation of allergic phenomena in common experience) I consider that the seasonal factor may be included in a wider conception, which is atmospheric crisis, by which is meant extremes or rapid changes of temperature and humidity.

The food of paramount importance to this community for both quantity and quality—i.e., vitamin value—is milk. In its comparative absence in the hot dry season it appears that the cereal toxamins of Mellanby (1932) have optimum conditions for exerting their effects. It was found that in the most severely pellagrous group coffee consumption was highest, and it is therefore of interest to note that intolerance to coffee has been recorded by Lickint—i.e., coffee is a potential allergen. The consumption of meat and green vegetables amongst these natives was almost negligible. Many of them in the hot dry season eat nothing but whole-millet. The variety is *Sorghum caudatum*, Stapf, *var. feterita*, a miserable white or cream grain of recognised poor food value. A neighbouring Arab tribe, the Shukria, who eat mainly a bigger grain of a yellow to orange colour, *Sorghum durra*, Stapf, are known to be less severely pellagrous.

W. H. Wilson (1921), utilising a table published by Thomas (1909), has shown that, in pellagrous diets, the biological protein value (B.P.V.) is below the critical value of 40 to 45 g. per diem. The daily averages for all groups in Abu Deleig were below this figure. Certain histories suggested that millet, coffee, and milk might serve as allergens in pellagrins. Samples of the local well waters were taken for analysis and found to be high in calcium content.

DISCUSSION

Impressive findings were that there was an allergic factor involved deriving from the food, that pre-active, active, and post-active phases of the disease existed; that in the hot dry season, the period of maximum active pellagra and intensest insolation, the population was practically deprived of its vitamins A, the postulated B_2 and C, and also of its food source of vitamin D and cholesterol; and, lastly, that in this season also the B.P.V. of a diet fell below the critical value of 40 to 45 g. daily—meaning that some persons were living on their own cell-protein, and that others on the borderline might have to do so in the event of increased katabolism demanding extra nitrogen utilisation. In the circumstances it has seemed not unreasonable to add yet another to the numerous theories of pellagra, none of which has explained all the phenomena associated with the disease.

No place has been found, in my theory, for water-soluble vitamin B_2. Its existence has been postulated on laboratory findings in monkeys and rats and on the therapeutic effects of diets in pellagrins. It has not been isolated and no evidence as to its chemical nature has been put forward. Further, the existence or otherwise of phytosterol, cholesterol, and ergosterol in B_2-free diets used for laboratory experiment is not always clear. One or more of these three substances is to be found in all diets on which pellagrins have improved; milk, meat, liver, green vegetables, and yeast are ready examples.

The fundamental condition in pellagra is, in my opinion, one of multiple avitaminosis and cholesterol-lack. The vitamins primarily concerned are the fat-soluble A and D; a lack of C is contributory. The action of cereal toxamins is thus permitted to add the signs and symptoms of their effects to those associated with deficiency of the vitamins.

Lack of vitamin A may be held to account for impairment of the integrity of epithelial surfaces, thus conducing to the entry to the blood stream of potential allergens: foreign protein substances, from the mouth, stomach, and intestine. Deficiency of vitamin C as it impairs capillary walls may also be considered to facilitate allergic manifestations. Lack of cholesterol, phytosterol, and ergosterol in the food, concomitantly with vitamin D, means that if this latter is to be obtained by the tissues, cholesterol

must either be synthesised in the body or mobilised from the body's store; this exists most notably in the brain, spinal cord, gonads and adrenals.

Vaughan, quoted by Clark (1932), has claimed that whenever protein is broken down there is liberated a protein poison, which is soluble in alcohol, diffuses through membrane, and on injection into a dog produces anaphylactic phenomena. The B.P.V. of pellagrous diets implies that cell-protein is broken down, and thus Vaughan's soluble protein poison is presumably available as a potential allergen in pellagrins.

If, now, the medley of signs and symptoms embraced by the term pellagra be considered, it will be seen that most of them can be ascribed to one or other of the factors detailed above. To lack of vitamin A may be ascribed stomatitis, possibly glossitis, gastritis (dyspepsia), enteritis, bladder affections, vulvo-vaginitis, the preputial affection described by Stannus (1911–12), night-blindness, sterility and, indirectly through toxamin effects, subacute combined degeneration. Further, it contributes to the causation of allergy. (It is of interest that allergy exerts its effects impressively on skin and mucous membrane, the epithelial tissues and those on which vitamin-A deficiency works havoc.) Vitamin-C deficiency appears to be responsible for the discoloration of the gums and possibly also of the tongue. It may also be to blame for tenderness of the calves and certain joint affections.

To lack of vitamin D and consequent mobilisation of the body-cholesterol may be ascribed headache, vertigo, formication, irritability, epilepsy, mania, melancholia, sleep dysfunction, sexual dysfunction, pigmentation abnormalities and subacute combined degeneration. (The exact relationship between toxamin effects and the fat-soluble vitamins is not clear.) Pathological findings in pellagra are notably present in the central nervous system, in the gonads, and in the adrenals. Writers quoted in the Medical Research Council's report for 1932 have shown that vitamin D may be prepared from highly purified crystallised cholesterol obtained from brain tissue.

To quantity-starvation—i.e., a low B.P.V.—may be primarily ascribed wasting, for the pellagrin has to use up first of all his body fat; thereafter demands on his cell-protein will account for a state of active or potential allergy. Allergic manifestations have been claimed above to depend upon atmospheric crisis; to this may now be added actinic and tactile trauma.

It is well known that the dermatitis of pellagra, while very obviously affecting the areas of the body exposed to the sun, also affects "pressure points"—i.e., places of tactile stimulus, such as the elbows and the knees. I noted with interest that the Egyptian pellagrins in Cairo were affected on the knees, elbows, buttocks, and over the trochanters: one of them who had attempted suicide some time before bore the pigmented trace of the rope and knot round his throat. That a similar or common process is at work in Addison's disease readily suggests itself. In short, in pellagra tactile stimuli, particularly if repeated, may induce manifestations of reaction.

Wright quotes the experiments of Lewis on the response of skin by a state of factitious urticaria to heat, cold (extremes and rapid variations), and touch; a causative vaso-dilatory substance of a histamine-like nature, known as H-substance, being postulated. It has been suggested that the reaction of the skin to light trauma by redness, desquamation, pigmentation, and increased reaction after six months, described by Finsen, is of a similar nature and also due to H-substance. It seems, further, that this H-substance may be the soluble protein poison of Vaughan. The dermatitis of pellagra seems to have everything in common with these phenomena.

The dermatitis of pellagra is an allergic response to light and tactile trauma and the pigmentation is protective. Allergens are known to vary in allergic power—certain pollens as compared with others, for example—and it seems reasonable to assume that response to trauma will be greater in those in whom greater allergen content is circulating in the blood. From this it seems natural to find that, as a rule, the more severely ill a pellagrin is the more severe are his skin symptoms. That pigmentation is protective is suggested by several facts.

Some Sudanese pellagrins who said that they once upon a time suffered from the characteristic burning pain of the extremities but had not done so for several years were appreciably darker than their fellows and some of them had a very definite deepening of pigmentation on the forehead and cheeks. Secondly, the women pellagrins at Abu Deleig, who are strikingly pale as compared with the males, were very much more severely ill. Thirdly, among these Sudanese cases the palms and soles and sides of the palms and soles, and not the dorsal aspects, usually showed burning and desquamating: the palms and soles of the Sudanese are much paler than are the dorsal aspects of their hands and feet. Fourthly, the Egyptian pellagrins were very much more ill than were any of my Sudanese cases and they were much paler. Further, on the sites where the dermatitis had completed its active phase and the scabs were falling away, I was astonished to see that there was no appreciable residual pigmentation in the skin beneath (the scabs were pigmented, of course). Were these Egyptians so severely ill because they could not deposit permanent protective pigment?

The rôle, if any, of photosynthesised vitamin D in pellagra has not yet been discussed. That it does play a part is suggested by the facts that the blood-calcium is increased in pellagrins and that the severer the disease the less the dental caries. In other words, there is possibly an unusual photosynthesis of this vitamin in progress. Hou, quoted by the Medical Research Council (1932), has shown that birds derive vitamin D from the sebaceous preening gland. In pellagra the sebaceous glands hypertrophy (or at any rate their orifices do) and pour forth a yellowish secretion on the surface of the skin; this secretion has been aptly likened to sulphur-flakes. Prof. Wilson, of Cairo, demonstrated to me that if a microscope slide was drawn down the nose of a pellagrin, the sulphur-flakes would powder away and no greasy smear would be left on the slide, as was the case with a slide drawn down the nose of a non-pellagrin. This, in addition to being a useful clinical aid, suggests that the sebaceous glands are an important site of vitamin-D manufactured from mobilised body cholesterol; the photosynthesised vitamin D being used up almost immediately it is made and the sulphur-flakes being the non-fatty by-products or residuum; normally sebum is rich in cholesterol and fats.

That vitamin D is an antidermatitis vitamin may be read into the fact that the burning pain of pellagra, which is presumably a phase of the dermatitis, comes on when a subject enters the darkness after being exposed to light, the suggested explanation being that when vitamin D is so lacking through its absence from the food, as also are cholesterol, phytosterol, and ergosterol, what little can be produced from body sources is probably immediately utilised in countering sun-trauma. The effects of this, however, are more lasting, and thus come into conscious appreciation in the dark when sunlight is no longer available to continue the frantic manufacture of minute but effective quantities of vitamin D.

It would be only natural that a vitamin manufactured in the skin should have a special relationship to the health of the skin, and I suggest that vitamin D is the antidermatitis and possibly also an anti-allergic vitamin. There are no data suggesting its mode of action except that the blood-calcium is

raised in hypervitaminosis D (as in pellagra) and thus may conduce to the control of allergic phenomena.

It seems that pellagra on diets other than cereal diets, in cases of gastro-intestinal disease and in the alcoholic (who has a lessened appetite and an impaired gastric mucosa), may be explained by the fact that the entrance of allergens to the blood from the alimentary canal and from cell-protein broken down to maintain the nitrogen balance, is to be expected. Given a degree of vitamin-lack, particularly vitamin-D lack—and here the question of adequate insolation in prisons, asylums, and poverty is of interest—there is then wanting only atmospheric crisis and sun trauma for pellagrous manifestations to develop. In England, cases occur in the bright sunshine of spring after the dull, sunless winter, a period of vitamin deprivation. In the Sudan the fierce insolation, the vitamin deficiency, and quantity-starvation all occur together.

The importance of maize in the history of pellagra seems to be explainable by two things. First, maize, after oats, has the highest toxamin value among cereals and therefore will require a bigger amount of the fat-soluble vitamins to keep its evil effects in abeyance than will millet and wheat. Secondly, maize is the staple diet of vast populations living in subtropical and tropical areas where a hot, dry season results in vitamin deprivation, semi-starvation, and actinic trauma for a period of four to five months a year. The rôle of maize is thus incidental, while at the same time the Italian insistence on its containing a toxic factor is vindicated.

In conclusion, certain points of anthropological interest emerge. One is that, as women are more severely affected than men, a pellagrous tribe that is endogamous tends to extinction, preceded possibly by polyandry, or to become exogamous. Another point is that the vulvo-vaginitis and preputial dermatitis of uncircumcised pellagrins (cf. the cases of Stannus in Nyasaland) are possibly greater factors in the origin, spread, and popularity of male and female circumcision than are the magico-religious mechanisms usually advanced in explanation. As usual, the fact is more important than the belief.

SUMMARY

(1) Pellagra in a Sudanese community of millet-eaters is described. From 103 individuals data were collected relating to occupation, diet, sun-exposure, medical history, and present condition.

(2) The following facts emerged: (*a*) In the period of maximum incidence of pellagra, the hot, dry season, the community's main protein, cholesterol and vitamin supply (which is its milk) sinks to a practical deprivation; millet alone remains as a food item. (*b*) An allergic factor is present in pellagra. (*c*) The severer the pellagra, the less the degree of dental caries. (*d*) Objective signs of the dermatitis of pellagra in these pigmented Sudanese are rarely appreciable.

(3) In a new theory of the causation and nature of pellagra it is suggested: (*a*) that the fundamental condition is a lack of cholesterol and vitamins A and D in the food, lack of vitamin C being a contributory factor; (*b*) that pellagra is largely allergic and that the evils resulting from cholesterol and vitamin-deficiency contribute to the syndrome, as do also cereal toxamin effects; (*c*) that pigmentation is protective against the actinic and tactile traumata affecting the skin of pellagrins; (*d*) that vitamin D, and not the hypothetical water-soluble vitamin B_2, is the anti-dermatitis vitamin.

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THE PRACTICAL TREATMENT OF RICKETS IN CHILDREN*

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In the concluding paragraph of a recent report to the Medical Research Council, Spence [1] suggests that "there are sufficient cases of human rickets in the big towns living under conditions which are suitable for comparative therapeutic tests of antirachitic substances." The following observations made in 1929 are therefore submitted in the belief that they may still prove of value to investigators in this field.

The difficulty then experienced seems to be intensified to-day—namely, the assessment of the potency of the many antirachitic preparations and agencies available. It was observed that rickets cases even while in hospital were receiving more than one preparation, were exposed to sunlight, and, in addition, were placed under ultra-violet lamps. The results, albeit excellent, could not be attributed to any one agency. It was decided, therefore, to run parallel series of cases employing different "curative" agencies with controls on the lines of biological experiment.

Beds were allocated in Woodend Municipal Hospital, and rickety children were received from the child welfare clinics under the direction of the maternity and child welfare officer for the city of Aberdeen. Little difficulty was experienced in selecting suitable cases in children from two to three years of age exhibiting gross rickets. The predominant type in Aberdeen was the fair, plump, soft child, with square head and thickened epiphyses. Beading of the ribs was common but craniotabes rare. The most obvious deformity was seen in the lower limbs, all degrees from bowing to sharp angulation being observed in the cases selected. Greenstick fractures of the radius and ulna were common.

X ray appearance.—Each child was radiographed on admission, the appearances of the tibia and fibula being taken as an index of rickets. These bones were selected in preference to the radius and ulna since deformity could be noted as well as the acuity of the disease. Most of the cases belonged to Bromer's [2] second or active type. Broadening of the rarefied diaphyses was seen, and in the older children compensatory periosteal thickening of the distal end of the shaft ("beaker" type of Gottsche). The epiphyses were shadowy and ill-defined. Under successful treatment the osteoid layer thickened, producing the typical cuff (manchette), the epiphyses became distinct, and ultimately the clean-cut outline of normal bone was taken as evidence of cure.

For *classification* purposes three grades of severity of rickets were recognised.

R. 1 (mild), where the diaphyseal line was blurred and slightly broader than normal, with a corresponding lack of sharpness of the epiphyseal centre.

* In part communicated in a paper read to the Association of School Medical Officers of Scotland, Aberdeen, June 3rd, 1933.

R. 2 (moderate), where there was distinct broadening of the diaphysis with an indistinct or wavy outline, combined with rarefaction of the shaft and an indistinct epiphysis.

R. 3 (severe) when the diaphysis was blurred, "cupped," or appeared "frayed out" and the epiphysis not seen at all.

The degree of deformity was similarly designated.

D. 1 (mild). Showing slight uniform bowing of the shaft.
D. 2 (moderate). Marked uniform bowing.
D. 3 (severe). Showing sharp angulation or twisting.

FORMS OF TREATMENT COMPARED

The experiments were made during the winter months and all natural ultra-violet radiation was excluded from the children, who were confined to bed in a special ward. The following daily diet was strictly adhered to in all the groups: porridge with cream, toast, cocoa with milk; soup, mince and potatoes, milk pudding with cream; bread, toast or biscuits, with milk or cocoa; warm milk. Fresh fruit was allowed.

Controls.—The ten rickety children selected received the above diet only, and were excluded from all ultra-violet radiation. The general condition of the children improved greatly, but skiagrams taken at the end of four, six and eight weeks revealed little, if any, change in the appearance of the bones.

Ultra-violet irradiation.—A similar series (seven cases) were exposed to the radiation of carbon-arc lamps. The output of these lamps before and after the course of treatment was 80–140 units according to the resistance employed as measured by the photo-electric method.[3] The power at normal setting of the control resistance was 90 units, which corresponds to the production of a first degree erythema in 4·2 minutes at three feet distance for unpigmented skin in an adult of average sensitivity. Graduated daily exposure with a maximum of 20 minutes at five feet was adopted. Subsequent radiograms showed that in most cases cure was effected within four weeks and in all cases at the expiry of eight (Table I.). The outlines of the bones were clean-cut and decisive.

TABLE I.—*Effects of Ultra-violet Irradiation on Severity of Rickets*

No.	Age.	Date in 1929.	Before and after treatment. Class.		Date in 1929.	Class.	
			R.*	D.*		R.	D.
1	2 4/12	April 9th.	1	3	May 20th	0	3
2	2 2/12	May 21st.	3	2	July 1st.	0	2
3	2 2/12	,, 24th.	3	2	,, 1st.	0	2
4	2 5/12	Feb. 3rd.	3	0	March 20th.	0	0
5	2 6/12	April 12th.	2	2	May 21st.	0	2
6	1 8/12	,, 9th.	3	1	,, 20th.	0	1
7	2 2/12	August 8th.	4	2	Oct. 11th.	0	1

Class. = classification.
R* 1, 2, 3 = degree of severity of rickets. D* 1, 2, 3 = degree of deformity.

Quartz-mercury vapour lamps were equally effective using similar dosage as measured by erythema or by the photoelectric cell, but carbon-arc lamps were preferred since their ultra-violet ray output remained more constant throughout the period of the experiment; also many children could be exposed simultaneously to one lamp.

Cod-liver oil was administered to five children. The oil was obtained locally. The producers gave the vitamin-D content to be 200 units of antirachitic activity per gramme as measured by the "line" test.[4] One drachm was given per day, no difficulty being experienced in getting the children either to take or tolerate it. Radiograms showed satisfactory healing within six weeks in most instances (Table II.), but the results were not so clear as those which were obtained by ultra-violet irradiation.

TABLE II.—*Cod-liver Oil*

No.	Age.	Date in 1929.	Before and after treatment. Class.		Date in 1929.	Class.	
			R.	D.		R.	D.
8	2 4/12	August 20th.	3	2	Oct. 11th.	1	2
9	4 5/12	,, 2nd.	4	3	,, 11th.	1	3
10	2 5/12	,, 27th.	2	1	,, 11th.	0	1
11	3 4/12	Oct. 15th.	1	2	Dec. 10th.	0	2
12	2 11/12	,, 29th.	1	0	,, 10th.	0	0

Vitamin-D product I.—This was a proprietary preparation originally derived from cod-liver oil; but later, in 1929, a preparation of irradiated ergosterol was marketed under the same name. The latter product was used in the work here described. The full daily dose ℞ 4 as given to six children purported to be three times as active as one drachm of cod-liver oil. The results, given in Table III., were frankly disappointing.

TABLE III.—*Vitamin-D Product I*

No.	Age.	Date in 1929.	Before and after treatment. Class.		Date in 1929.	Class.	
			R.	D.		R.	D.
13	2 5/12	May 24th.	1	0	August 2nd.	1	0
14	2 4/12	,, 8th.	3	1	June 17th.	2	1
15	4	June 25th.	1	3	August 29th.	1	3
16	1 6/12	May 21st.	1	0	,, 2nd.	1	0
17	2 5/12	Jan. 15th.	3	1	March 2nd.	1	1

Vitamin-D product II was similar to vitamin-D product I, but by the addition of malt, fruit juice, &c., contained also the accessory vitamins A and C. Skiagrams showed this product to resemble closely vitamin-D product I in its efficacy.

Vitamin-D product III was an irradiated ergosterol product and was given to seven children. The full daily dose given corresponded to half an ounce of cod-liver oil as regards vitamin-D potency. The results are shown in Table IV. It will be observed that these were generally severe cases of rickets

TABLE IV.—*Vitamin-D Product III*

No.	Age.	Date in 1929–30.	Before and after treatment. Class.		Date in 1930.	Class.	
			R.	D.		R.	D.
		1929.					
18	3 1/12	Nov. 12th.	1	3	Feb. 1st.	1	3
		1930.					
19	2	March 5th.	3	2	April 10th.	3	2
20	2	,, 6th.	2	1	,, 10th.	2	1
21	1 10/12	,, 6th.	3	2	,, 10th.	2	2
22	2 2/12	,, 10th.	3	3	,, 22nd.	3	3
23	3 6/12	,, 17th.	3	3	,, 22nd.	3	3
24	2 1/12	,, 18th.	3	1	,, 22nd.	3	1

and that the ergosterol was not administered for much longer than one month since the ward was in demand and it was desirable to heal the cases quickly. Accordingly, as in the other groups the unhealed case received four weeks' course of ultra-violet ray treatment and in every instance cure was effected. The results of the irradiated ergosterol group, however, were at such variance with

those reported by other workers, such as Hess,[5] that several samples were tried out on rats by Mr. H. D. Griffith of the natural philosophy department of Aberdeen University. From his experiments he concluded that "the sample of ergosterol used was either incompletely activated or it had lost its activity subsequent to preparation." In one group the rats had actually received daily a dose equivalent to a daily dose of 13 tablets to a babe, with no demonstrable effect.

Cost of treatment.—If the vitamin-D products had proved efficacious, the cost of treatment would have been as follows: Cod-liver oil, 4*d.*, vitamin-D products I and II, 8*d.* each, and vitamin-D product III, 1*s.* 8*d.*, for the full course.

After results.—In June, 1933, the cases treated in this series were reviewed, and of 27 children 4 could not be traced and one had died of pneumonia. The remaining 22 showed permanently healed rickets with fully corrected deformities as regards the lower limbs. Four of these were said to have been exceptionally healthy since discharged from hospital. Four others had not enjoyed good health, the disabilities reported being acute mastoiditis, corneal ulceration, and general debility.

CONCLUSIONS

(1) When once developed rickets requires more than an adequate diet to ensure an expeditious cure. (2) In ultra-violet therapy we have a rapid curative agency, the artificial variety (e.g., carbon-arc lamp) being especially suitable for clinics and institutions. (3) A reputable brand of cod-liver oil is probably the cheapest effective substance and one which lends itself to domiciliary administration in the cure or prevention of rickets. (4) Regarding the many expensive preparations of the "potted alphabet" type, which doubtless to-day contain their quota of antirachitic units, it is suggested that a preliminary trial *in children* such as has been described, should be made before employing them on a large scale. (5) I may add that although deformities may ameliorate under treatment, surgical intervention is advisable for the grosser forms and should not long be delayed.

Grateful acknowledgment is made to Dr. J. A. Stephen, maternity and child welfare officer, Aberdeen, for his invaluable coöperation throughout, to Mr. H. D. Griffith, Aberdeen University, who conducted the animal experiments and assessed the U.V.R. output of the lamps, and to Dr. H. J. Dawson, school medical officer, Aberdeen, who collected the cases for review.

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CLINICAL AND LABORATORY NOTES

TWO CASES OF MENINGITIS DUE TO BACILLI OF PFEIFFER TYPE

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MENINGITIS due to organisms of the Pfeiffer type is by no means common in this country. Hence it has been thought worth while to place on record two cases in both of which recovery ensued.

DR. DYKE'S CASE

The patient was a male aged 22. A radical mastoid operation was performed in 1928; since then the health had been good. On May 6th, 1933, while at a football match he became conscious of a profuse watery discharge from the left ear; he mopped it up from time to time with his handkerchief but otherwise paid no attention to it. Next day the discharge had ceased; he had a slight headache but otherwise felt well. On May 8th the headache was worse but he was able to go to Birmingham on business in the morning; at 11 o'clock he became very dizzy, vomited, and started to feel very ill. He was able to return to his home 15 miles away; on the following day he was seen by Dr. C. A. Day. The temperature was 101° F., the pulse-rate 70; he complained of violent headache and pain in the neck and over the sternum, and he vomited several times during the day. On May 10th the pain in the head and neck was a great deal worse; temperature 102°, pulse-rate only 68; he was seen by an aural surgeon (Mr. W. Hallchurch) who could find nothing in the ears to account for the trouble.

On the following day he was removed to a nursing-home where he was seen by myself in consultation with Dr. Day. Temperature at this time 101°, pulse 62. The pain in the head and neck was very violent; the patient showed Kernig's and Brudzinski signs, otherwise physical examination was negative. Lumbar puncture was performed, and turbid fluid obtained under pressure. Examination of the fluid showed numerous pus cells but no organisms could be seen. In view of the apparent aural source of the infection the streptococcus was regarded as the most likely cause of the infection and it was decided to inject antistreptococcal serum. A second lumbar puncture was performed and 30 c.cm. of turbid fluid withdrawn. A mixture of 10 c.cm. each of polyvalent antistreptococcal and of antiscarlatinal serum (B. W. & Co.) introduced intrathecally.

The fluid withdrawn at first puncture was sown into glucose ascitic broth and on to an ascitic agar plate, half of which had been covered with a thin layer of human blood agar as a means of identifying hæmolysis should streptococci be present. The broth gave no growth, but after 48 hours' incubation the plate showed numerous minute colonies growing only on the blood-covered half of the plate. Microscopically the organisms consisted of a very minute Gram-negative rod morphologically identical with the bacillus of Pfeiffer. Attempts to subculture it were unsuccessful and it was never again obtained from any subsequent puncture. The fact that it grew only in the presence of blood classed it as hæmophilic, and this, together with its appearance, served to identify it as a member of the Pfeiffer group.

The patient continued to run a temperature up to 102° for two weeks; for the first week the condition remained practically unchanged; lumbar puncture was performed daily on six consecutive days; on every occasion turbid fluid under pressure was withdrawn. From the end of the first week on there were signs of improvement, and lumbar puncture was performed on alternate days for three days, making a total of twelve punctures in 16 days.

In the first specimen of cerebro-spinal fluid the cells, all polymorphs, were too numerous for counting. By May 15th they had fallen to 2000 per c.mm., thereafter they fell until on the 17th they had reached about 400 per c.mm. They remained more or less at this level up to the time of the last puncture. Sugar was absent from the first specimen of fluid obtained and remained absent until that obtained on the 17th; thereafter no observations were made; the chlorides on first examination were 0·66 per cent.; by May 13th they had fallen to 0·59 per cent.; by the 16th they had risen to 0·61 per cent.; thereafter they rose slowly and at the time of the last puncture on the 25th were 0·63 per cent.

From the end of the second week the temperature fell gradually; it took two weeks for the range to fall within normal limits; by this time the patient was obviously

on the way to recovery. He was well enough to leave the nursing-home 28 days from the time of his admission.

In September the patient went for a pleasure cruise, during which he apparently took advantage to the full of all the available means of diversion; he returned to his business on the Stock Exchange at the beginning of October. His health is now excellent but temper very bad; he complains only of a continuous annoying pain over the coccyx.

DR. HARWOOD LITTLE'S CASE

The patient, a boy aged 8 years, was seen by his doctor on Feb. 16th, 1933, with slight pyrexia, coryza, and sneezing, the condition being apparently influenzal. On the 18th his morning temperature was 102° F.; he complained of no pain and the evening temperature was normal. During the night he had acute pain in left ear. Feb. 19th: morning temperature 105°. Surgeon called in, who lanced the tympanum and released a little pus. Feb. 20th: ear quite clean, but morning temperature 105°.

I saw the child for the first time that evening. There was neither headache nor vomiting, but flexion of the neck caused pain in the upper dorsal region; there was a doubtful Babinski in the right side, and a distant suspicion of a positive Kernig's sign. Lumbar puncture produced 22 c.cm. of clear fluid under pressure and examination of the fluid gave the following results. Cells: 10 per c.mm., of which 60 per cent. were polymorphonuclears and 40 per cent. endothelial cells. No small lymphocytes were seen, and no micro-organisms were found in the stained deposit. Globulin: slight but distinct increase. Protein: 45 mg. per 100 c.cm. Sugar: 25 mg. per 100 c.cm. Chlorides: 720 mg. per 100 c.cm. The fluid was plated at the bedside on to warm Fildes's medium and on to warm blood agar. Both plates gave a sparse growth of a Gram-negative bacillus morphologically of Pfeiffer type. It survived one subculture, and then died in spite of strenuous efforts to keep it alive. At the time of lumbar puncture a leucocyte count showed: white cells 59,600 per c.mm.; polymorph neutrophils 85 per cent.; eosinophils 0 per cent.; basophils 0 per cent.; lymphocytes 10 per cent.; and monocytes 5 per cent. There were many immature neutrophils and some metamyelocytes.

Feb. 21st: morning temperature 105° and evening 103°. Feb. 22nd: white cells, 15,500 per c.mm., with 76 per cent. neutrophils and no eosinophils. From Feb. 23rd onwards the temperature was normal. The patient left the nursing-home ten days later, and has been in perfect health since.

These two cases were communicated to the discussion on the prognosis in meningitis held at the meeting of the Association of Clinical Pathologists on Jan. 27th last.

EPIDERMOLYSIS BULLOSA WITH PSORIASIS

By A. G. Smith, M.D. Glasg., F.R.C.S. Eng.
CONSULTING DERMATOLOGIST, NORFOLK COUNTY COUNCIL

Epidermolysis bullosa is a decidedly rare disease, and the combination of epidermolysis bullosa and psoriasis is still more rare.

The patient, whom I first saw seven months ago, was a little boy of seven, the only son of first cousins. A maternal aunt suffered from psoriasis, but otherwise there was nothing of note in the family history. The child was mentally alert.

The mother, an intelligent young woman who had been a school teacher before marriage, stated that she first noticed something wrong with the child's skin a few months after birth. The most trivial injury produced a blister which burst, left a raw area, and in a fortnight or so healed with the formation of a scar. The skin seemed to be excessively vulnerable and responded with a blister to the slightest stimulus. A year ago she first noticed a psoriasis patch on the healed scar of an epidermolysis bullosa lesion on the left knee, and since then many patches of psoriasis had arisen. When I saw the child he presented a typical picture of severe epidermolysis bullosa—the pemphigus successif à kystes épidermiques of Darier. The dorsa of the hands and fingers, the elbows, knees, and feet were the areas most severely affected, but there were healed lesions on the trunk and on the ears. His markedly sunburnt skin was speckled in these sites with thin white scars, amidst which were numerous epidermal cysts. Here and there raw lesions showed red, and numerous recent bullæ, some containing blood, were present. The nails of the fingers and toes were reduced to shapeless knobs of horny material; the teeth were decidedly carious. The psoriasis patches were quite typical and were disposed on the knees, elbows, and back in guttate formation.

I was hesitant about using any of the stronger medicaments for the psoriasis in view of the susceptibility of the skin to any injury, but ½ per cent. cignolin in ung. lanæ co. over a localised area to start with and subsequently on all the psoriasis lesions removed that disease. At the same time I tried the effect of calcium and parathyroid on the epidermolysis bullosa, with little apparent benefit up till the present time.

There are two points of interest in this case apart from the superimposition of psoriasis. The first is that there is no evidence of hereditary affection with regard to the epidermolysis bullosa; this is unusual. I have been at some trouble in investigating the family history of the child reported here, but the little patient appears to be an isolated sufferer in his family. The second feature of interest is in the consanguinity of the parents. G. B. Dowling has met with a similar phenomenon, which he mentioned in a discussion at the Royal Society of Medicine in December, 1932; and later (October, 1933), at the same place, Twiston Davies showed a case of epidermolysis bullosa in which the parents were first cousins.

Norwich.

SEROLOGICAL DIAGNOSIS OF LATENT MALARIA

By E. D. W. Greig, C.I.E., M.D., D.Sc., F.R.C.P. Edin.
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C. E. van Rooyen, M.B., Ch.B. Edin.
HALLEY STEWART RESEARCH FELLOW, DEPARTMENT OF BACTERIOLOGY; AND

E. B. Hendry, B.Sc.
CHEMIST, DEPARTMENT OF THERAPEUTICS

A. F. X. Henry has demonstrated [1] the property of malarial sera to flocculate solutions of iron methylarsenate and melanin pigment contained in ox choroid membrane. The former test he termed "ferro-flocculation"; the latter, which was found to be more sensitive, "melanoflocculation." Henry maintained that the phenomenon was due to the interaction of melanin pigment, which behaved as an antigen, and a corresponding antimelanagglutinin developed in the sera of malarial subjects. He regarded the reaction as specific for malaria and of value in the recognition of the latent infection when parasites were absent in peripheral blood. Several continental workers have confirmed [2] the latter observation and we have obtained similar results.

A number of difficulties have however been encountered owing to the unsuitability of crude aqueous suspensions of ox choroid membrane for use as antigen, arising from its instability and the large amount of ox tissue derivatives contained in it other than melanin pigment. The test as employed by

[1] C.R. Soc. Biol., 1928, xcix., 819; Arch. f. Schiffs- u. Tropen-Hyg., 1934, xxxviii., 93.
[2] See Greig, E. D. W.: Trop. Dis. Bull., 1934, xxx., 483.

Henry merely signifies that the serum examined has or has not agglutinated the antigen in a single low dilution. No provision was made for assessing the degree of positivity exhibited by different sera or the same specimen at various stages during the course of an illness. We have attempted to overcome these difficulties by the substitution of human hair for ox choroid membrane as a source of pigment, and by alterations in technique.

TECHNIQUE OF THE NEW TEST

The melanin pigment solution is derived from human hair by hydrolysis with 50 per cent. HCl, followed by concentration in vacuuo and purification by dialysis in a collodion membrane. This has been found to give a pure and stable suspension of pigment. A set of nine dilutions of patient's serum is prepared ranging from 1 : 2 to 1 : 512 in distilled water. To each is added an equal volume (0·4 c.cm.) of pigment solution, and the series is incubated at 37° C. for 5½ hours before the reading is taken. Positive results are observed as white granular precipitates forming at the foot of the tube ; the degree of positivity is determined by noting the highest dilution of patient's serum showing precipitation.

The rise and fall of the reacting principle in human malarial sera with melanin pigment may thus be quantitatively ascertained during an attack. The method was tested on benign tertian infection induced in cases of G.P.I. Preliminary observations showed that the reaction appears about the 5th–7th day following infection, although no parasites may be seen at this stage and the patient is afebrile. The maximum titre of 1 : 128 is reached about the 4th week and then rapidly declines following the administration of drugs. Control tests on 129 different non-malarial sera gave only 2 non-specific positive results.

It is probable that the phenomenon is not due to the interaction of antigen and antibody, for it can be shown that positively reacting sera may be inactivated by heating to 55° C. for half an hour and that the repeated immunisation of rabbits with melanin pigment fails to produce an agglutinin response. The occurrence of a reaction with positive sera and dioxyphenylalanine shows that the reaction is due to the melanin and not to any other substance.

Observations on the lipoid phosphorus content of the serum during the course of the infection show that its amount tends to vary inversely with the reacting titre of the serum to melanin pigment. We suggest that the term melanoflocculation test should be dropped and melano-precipitation reaction substituted.

These findings were submitted to a meeting of the Edinburgh branch of the Royal Society of Tropical Medicine and Hygiene on May 15th, 1934, and a full account of them will appear in the July issue of the *Transactions* of the Royal Society of Tropical Medicine and Hygiene.

MEDICAL SOCIETIES

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY

PROSSER WHITE ANNUAL ORATION *

Dr. J. M. H. MACLEOD, the president of the society, took the chair on June 27th when the annual oration was delivered by Dr. WILLIAM ALLEN PUSEY, emeritus professor of dermatology in the University of Illinois.

The PRESIDENT said that in 1921 Robert Prosser White established a Trust Fund to provide an honorarium for an annual oration on the progress of dermatology, the orator to be selected by the council of the St. John's Hospital Dermatological Society. It had been laid down in the original deed that the name of the founder should not be revealed until after his death. Prosser White had died in January of this year, and the lectureship was now known as the Prosser White Oration.

Dr. PUSEY took as his title

Disease, Gadfly of the Mind

He devoted special attention to the stimulus of skin diseases in the development of the mind. Socrates, he recalled, had in the deepest seriousness emphasised his function of intellectual gadfly as his great service to the Athenians, a function placed upon him by God and so important that he claimed the favours reserved for Athens' worthiest citizens. The human mind had to develop itself, and its making was not a psychological or a physiological study but an historical one. The need to surmount the difficulties of life had always been the spur that had urged man on to intellectual as well as to physical effort. In that sense man's troubles had made him. Few incentives to thought had earlier influenced or more constantly prodded man in his progress than the injuries, pains, and illnesses that had beset him. Hippocrates had recognised this. The early efforts of man to find relief from his miseries had done a great deal more than gradually accumulate empirical knowledge ; they had begun his training in technical skill. From the earliest records medicine had been one of the chief concerns of the mind. The greatest heights of early independent thought had been reactions to the study of disease. From every point of view disease had been one of the greatest gadflies to scientific thought. Disease and its student medicine could properly claim to be among the great forces in the evolution of the human mind.

Skin diseases and dermatology could take a very large part of the credit of medicine, for they had constituted one of its major interests from the very beginning. Indeed, when civilisation emerged from the stage of history man had already been considering not only the diseases of the skin but also its care and beautification. The best illustration of the persistence of vitality of medicine in the Middle Ages was furnished by dermatology. At that time eight diseases had been regarded as contagious and five were predominantly skin diseases : bubonic plague, consumption, epilepsy, scabies, erysipelas, anthrax, trachoma, and leprosy. Leprosy had been largely responsible for the growth of hospitals and had given a new impetus to the objective study of disease. Since the diagnosis of leprosy changed the civil status of its victims, it was a matter of great civil importance. There was much evidence that the study of leprosy brought dermatology and general medicine to a higher plane of knowledge in this period. De Mondeville's description of the facies of leprosy was notable for accuracy of observation, vividness of description, selection of essential features, and evidence of a mind thinking in objective terms. By the end of the fifteenth century leprosy had been rapidly dying out, but it had been succeeded by the new plague of syphilis, which had done more than anything else to stimulate the objective study of diseases.

LANDMARKS OF DERMATOLOGICAL PROGRESS

A significant example in the last three hundred years was the work of Ramazzini on occupational dermatoses. To the list of things which the physician

* This oration will be published in full in the Proceedings of the Society.

should inquire as laid down by Hippocrates, he added one more: "What trade is he of?" Another striking illustration was the description of chimney sweeps' cancer of the scrotum by Percival Pott in 1775. This was the pioneer landmark in the history of our knowledge of the causes of cancer, drawing attention both to tar and to long-continued irritation. In the skin, as nowhere else, was given the opportunity for the recognition and study of cancer in its early stages. Another landmark was the beautiful demonstration by Bonomo of the causal rôle of the itch mite in scabies. Ramazzini and Bonomo had been among the first to demonstrate clearly the direct action of local causes in the production of inflammatory diseases, and their work was an epochal step in the advance of knowledge of pathology.

The skin was a happy hunting-ground for the investigation of the facts, particularly the minute facts, of biology and medicine. Unna had pointed out in 1896 that this exceptionally favoured position of the dermatologist brought with it a serious responsibility: to analyse the histological details closely and not to rest until macroscopical and microscopical appearances had been brought into agreement. Cutaneous pathology, he had observed, must have a great bearing on general pathology. A good modern illustration of this was Sir Thomas Lewis's use of the cutaneous circulation to illustrate methods of physiological investigation and interpretation of the phenomena of the peripheral circulation and small blood-vessels in general. Another example was Cockayne's study of abnormalities of the skin and its appendages in the light of genetics. The successful study of the finer details of tissues dated from the perfection of section cutting and differential staining by Carl Weigert, who at first applied his technique to the study of the small-pox eruption. Unna had carried staining methods still further and incidentally had discovered plasma cells and described other new forms of connective tissue cell.

The general ideas of contagion and its causes were likewise in great part the result of the study of dermatology. Fracastor, with his strong interest in syphilis and skin diseases, had developed the idea that contagious diseases were due to micro-organisms. Hauptmann of Dresden and Langer of Leipzig had suggested independently in the seventeenth century that all skin diseases were of parasitic origin. The first fact in human microparasitology was Schönlein's discovery of the organism of favus. The demonstration by Hansen of the bacillus of leprosy in 1871, eleven years before the discovery of the tubercle bacillus by Koch, was one of the earliest observations of pathogenic bacteria.

Studies of the skin manifestations of exanthemata had profoundly influenced modern conceptions of infection and immunity. Fuller in 1730 had clearly indicated the specificity of infection. The skin had likewise been the site of the first studies of what was now called allergy and sensitisation. Jenner had pointed out the allergic relationship between small-pox and vaccinia, and a group of Englishmen and Scotsmen had made a remarkable series of studies on the skin towards the end of the eighteenth century. The acquired tolerance of the skin to the bites of parasites and various insects had early led to the production of artificial immunity and later to the study of immunity generally. The critical tests of immunity to-day had developed from investigations on the skin, and their practical application was made in the skin. The skin was said to possess a degree of immunity more than ten times as great as that of muscle, brain, or blood. It was quite possible that the studies of the cutaneous manifestations of allergies might open up new chapters in the knowledge of the pathogenesis of important diseases of internal structures.

From time immemorial the influence of the general health on the skin had been emphasised, perhaps over-emphasised, but the influence of the skin on the general health was a relatively new conception. It performed chemical functions of vital importance, particularly under the influence of light.

Knowledge of the relation between the skin and the ductless glands went back at least a century, to the time when Addison described the disease which bore his name. The skin itself was now being recognised as an organ of metabolic activity and Kreidl had even suggested that it had an internal secretion. Hertalet had suggested that it might be a hormone balancer. The endocrine and metabolic functions of the skin had been used empirically by Finsen.

Dr. Pusey's thesis, he said in conclusion, was that diseases had been among the greatest incentives in the making of the mind and that few diseases had as great an influence as those of the skin. He did not believe that this excursion was a fanciful or trivial speculation. There was nothing more important in the evolution of civilisation than those relatively few goads of the mind which had first lifted the human race out of barbarism. The great rôle that skin diseases had played in the making of the human mind was the great challenge to dermatology to be worthy of its heritage and of its great opportunity.

NEW INVENTIONS

A KNIFE FOR SUBMUCOUS RESECTION OF THE SEPTUM

THE knife, here illustrated, has been designed and used by me for the submucous resection of the septum. It is double edged at the sides and somewhat oval-shaped at its extremity. The incision in the mucosa begins in the uppermost angle of the nostril and is continued in one sweep right down to the floor of the nose. The lower cutting edge starts the incision,

about half-way down the septum the extremity of the knife takes it up; then the upper cutting edge is engaged, and finally the extremity is again used to complete the incision on the floor of the nose. The advantages claimed are: facility of producing the incision with one single sweep and the impossibility of penetrating the septum, while it takes the place of a sharp dissector to detach the muco-perichondrium.

Mayer and Phelps, of 59-61, New Cavendish-street, W., are the makers of the instrument.

ARTHUR MILLER, F.R.C.S. Edin., D.L.O.

A NEW MENTAL HOSPITAL.—Mr. L. G. Brock, chairman of the Board of Control, laid the foundation-stone, last week, of a new mental hospital at Runwell, near Wickford, Essex, the former property of the corporations of East Ham and Southend. It is placed upon a site of 500 acres, and will eventually accommodate 1085 patients; at present it is being designed for 875. There will be a large nurses' home, and on a portion of the site there will be provisions for "parole" patients. The total cost will be £462,000.

REVIEWS AND NOTICES OF BOOKS

Forty Years of Psychiatry

By WILLIAM A. WHITE, M.D., Sc.D. New York: Nervous and Mental Disease Publishing Co. Pp. 154. $3.00.

Recent Advances in Psychiatry

Second edition. By HENRY DEVINE, M.D., F.R.C.P. London: J. and A. Churchill. Pp. 364. 12s. 6d.

1933 Year Book of Neurology and Psychiatry

Neurology. Edited by PETER BASSOE, M.D. *Psychiatry*. Edited by FRANKLIN G. EBAUGH, M.D. Chicago: The Year Book Publishers. 1934. Pp. 471. $2.25.

THE remarkable development of psychiatry during the last half century may be appreciated when one finds it summed up in the life and comments of an observer who has acted a prominent part in the promotion of this development. But the range of psychiatry is now so wide that the interests of even an unusually experienced man like Dr. White are of necessity limited. It is instructive to read first his account of what has happened in the United States, especially in regard to mental hospital administration and in the psychological approach to mental disorder; and then to go through a comprehensive survey of the present trends and knowledge, such as Dr. Devine supplies, and finally to glance at a cross-section of the current literary output in the 1933 Year Book of Neurology and Psychiatry.

Dr. White entered psychiatry when it was remote from general medicine, and he found the care given to the insane deplorable. He became superintendent of an important mental hospital (where there are at present 5000 patients), and he not only built it up with extraordinary ability but was among those in America who most energetically gave effect to the prevailing ideals—that mental disorder should be regarded as an illness, treated and investigated, given a large place in medical education, and brought into relation with other human problems, especially social ones. It might be supposed that the qualities requisite for the guidance of such an institution as St. Elizabeth's Hospital would hardly be associated with an ardour and receptivity for new, highly unorthodox ideas, but Dr. White early opened his mind to psycho-analysis and has espoused it with few reservations; he is one of those who see in it the most fruitful influence in modern psychiatry so far, and the most promising of further advance.

Dr. Devine gives a somewhat different picture. It is not that he is antagonistic; he is indeed sometimes so anxious to do justice to this school of thought that he falls into inconsistency, and one of the few points deserving of extension in his admirable book is the tacit assumption that there is practically no psychopathology other than that of the analysts. But since his task is to cover the whole field of psychiatry, he necessarily devotes much space also to those biological, metabolic, clinical, and experimental studies which have done so much to advance our knowledge. The three new chapters introduced into the second edition are concerned with heredity and with some clinical and chemical correlations. His fair presentation constantly reminds one how many are the aspects of this field, even when it remains strictly medical, and how difficult it is to tell which line of study will yield most, and which has fallen victim to bias, irrelevance, licence of hypothesis, or carelessness in verification.

Dr. Ebaugh's summary of current literature of the year is unfortunately heavily weighted on the side of American studies in what one may call the nebulosities of psychiatry—education, mental hygiene, social psychiatry, the psychiatric attitude and so forth; it has also the defect of being somewhat uncritical and of being written in a barbarous, careless English. It is useful in so far as it shows up the uncertainties in psychiatry, where so much is clinically fixed and useful and so little fundamental knowledge established. The contrast with neurology, the year's work in which is well presented by Dr. Bassoe in the same volume, is striking. Some might urge in excuse that neurology is a finite study, while psychiatry is living and in flux. But such a view would not only be unjust to neurology, but would ascribe to growth and vitality in psychiatry what is at least in part only evidence of a myopic and immature zeal on the part of workers with more knowledge of a special mode of investigation than of the actual material and problems of mental disorder to which they would apply it. It must be admitted that psychiatry needs a more complete background of accepted fact before scientific work can be readily communicable and discussion on it profitable.

Die Parasagittalen Meningeome

By Dr. H. OLIVECRONA, Stockholm. Leipzig: Georg Thieme. 1934. Pp. 144. M.24.

THE meningiomas form about 15 per cent. of all intracranial tumours and usually grow from an accessible part of the dura mater. Their diagnosis and accurate localisation are therefore of considerable importance. Dr. Olivecrona has presented in this monograph an elaborate study and analysis of his observations in 34 examples of parasagittal meningioma. He defines these as tumours springing from the wall of the superior longitudinal sinus alone, or from a combined site consisting of sinus wall and the adjoining dura covering the cerebral convexity. He includes also meningiomas of the falx both because these spring also from the sinus wall in many cases and because they present similar problems in operative technique.

The author divides his cases into three clinical groups according to whether the tumour arises from the anterior (10 cases), middle (14 cases), or posterior (3 cases) third of the sinus wall. In 7 cases the tumour was attached to the falx. A syndrome is outlined for each of the three groups, an outstanding feature in all groups being a long history. The symptoms in tumours in the anterior third are, as a rule, initiated by headache. The frequency of psychic disturbance of variable kind and intensity is stressed; such a disturbance was present in all except one example. Contralateral facial weakness, bilateral papilloedema, and hyposmia or anosmia are also common. Patients with tumours of the middle third of the sinus tend to have motor and sensory disturbances. Jacksonian attacks originating in the lower extremity are an outstanding feature. Psychic changes are rarer than in the first group, and general pressure symptoms develop late. Meningiomas of the posterior third of the sinus are seldom seen. Here hemianopia is a salient feature and, if the tumour is left-sided, sensory aphasic symptoms with alexia and agraphia will probably be found. The less constant signs and symptoms and the main points of differential diagnosis are discussed in reference

to all the groups. Tumours of the falx are classified according to the third of the sinus from which they originate.

Many interesting points in the morbid anatomy of the tumours emerge from this study. It is remarkable that Olivecrona has encountered a bilateral tumour in as many as 13 of his cases; the tumour seems to have started on one side and to have extended across the midline either by a process of invasion of the sinus wall or by hooking underneath the free lower edge of the falx. The mechanism of sinus invasion is described and illustrated by a number of microphotographs, which make it clear that the wall of the sinus rather than the lumen is invaded. Even when the sinus is almost completely obliterated the tumour is separated from the lumen by the intimal endothelium. This process appears to be only an exaggeration of the normal tendency of the arachnoid cells to become invaginated into the dural sinuses, forming the so-called arachnoid villi.

This monograph is well balanced and complete from all aspects except that of histological pathology. It is promised in the text, however, that this subject will be dealt with in the near future by Prof. Bergstrand.

Principles of Gynæcology

Fourth edition. By WILLIAM BLAIR-BELL, B.S., M.D. Lond., F.R.C.S. Eng., F.C.O.G., Emeritus Professor of Obstetrics and Gynæcology in the University of Liverpool. Revised and largely rewritten with the assistance of M. M. DATNOW, M.D., F.R.C.S. Edin., M.C.O.G., and ARTHUR C. H. BELL, M.B., F.R.C.S. Eng., M.C.O.G. London: Baillière, Tindall and Cox. 1934. Pp. 848. 35*s*.

THIS text-book has been written primarily for the use of students, for whom Prof. Blair-Bell has set a high standard of scientific training and intelligence. He states definitely that the book does not pretend to provide material for the training of gynæcological specialists though it may well serve as a groundwork for students with this aspiration.

The advances made in gynæcological knowledge since the publication of the last edition have been recorded in this edition. Completely new sections on such subjects as physiological phenomena dependent upon internal secretions, and on certain pathological lesions—for example, endometriomata and ovarian neoplasms—have been supplied. There is also a full review of present-day knowledge of the nature and treatment of malignant disease. New chapters are those on the history of gynæcology and on the sociological questions of contraception and therapeutic abortion, and other ethical and medico-legal considerations which may arise in gynæcological practice. The 144 pages devoted to the section of operative procedures cover much ground, and contain such detailed illustrations of the operations described in the text that the reader can follow the steps of an operation by a study of the drawings alone. Indeed, the illustrations throughout the book are unusually apt. Of the two appendices, one deals with post-operative exercises and the second with the ætiological classification of the causes of certain gynæcological symptoms and manifestations; these should be useful not only to the student reading for an examination, but also to the practitioner responsible for a patient suffering from a gynæcological defect. The index is satisfactory and the printing excellent.

This is a text-book that has definitely made a contribution to the teaching of gynæcology.

Dynamics of Therapy in a Controlled Relationship

By JESSIE TAFT. London: Macmillan and Co., Ltd. Pp. 296. 12*s*. 6*d*.

THIS is an obscure work. The detailed accounts of the cases are interesting and instructive in themselves, and, like the author, we are uncertain as to how the results were achieved. The name relation therapy which she gives to her methods is not very illuminating. All treatment by psychotherapy is relational and depends upon transference. Where her method differs from Freud's is in the insistence on the present situation; resolution is achieved not by reductive analysis, but by the resolution of fear which paralyses the ability to see life as a whole. This fear motive is held to be ultimately derived from its prototype which is the traumatic experience of birth, according to the ideas of Otto Rank. Unfortunately, in the author's attempt to clarify by explaining the dynamics of therapy, she becomes completely submerged in a sea of words.

Eclampsia in England and Wales

By NORMAN PORRITT, M.R.C.S., L.R.C.P., Consulting Surgeon, Huddersfield Royal Infirmary. London: Humphrey Milford, Oxford University Press. 1934. Pp. 88. 5*s*.

THIS small book is written in support of a theory that an insidious form of lead poisoning plays a definite part in the ætiology of eclampsia.

Dr. Porritt first called attention over 40 years ago to the possibility of this form of lead poisoning and he quotes many examples of effects which he attributes to it apart from pregnancy. His theory of its significance in the causation of eclampsia is based largely on a statistical study of maternal mortality figures and on the similarity between the lesions of lead poisoning and those of pregnancy toxæmia. After explaining the cumulative effects of small quantities of lead particularly on the pregnant woman, he points out that a high maternal mortality from diseases other than sepsis coincides with a soft water-supply such as is found in North Wales and the North of England. In these areas, which show a high maternal mortality-rate, there is no increase in the deaths from sepsis, whereas the death-rate from other causes is excessive.

The author has long retired from practice and has not the facilities for proving or disproving his theory. On the evidence put before him the reader cannot fail to be impressed with the reasonableness of the argument and of the necessity for an extensive investigation in a soft water area where eclampsia is common. An explanation of the high maternal mortality in the "black areas" has been offered which can only be investigated on the spot.

British Journal of Children's Diseases

IN the issue of April–June (Vol. XXXI.) Dr. R. F. Guymer contributes a paper entitled Tonsillectomy: Before, During and After, based on a study occupying nearly six years of 182 cases living in the Kingston-on-Thames district. The dissection method was used in each case. The following points are considered: the presence or absence of subjective symptoms referable to the throat, the state of nutrition of the patients, and the average number of professional visits paid to each patient during each year before and after the operation. In no case did the tonsils show any signs of recurrence, and it is now two years

since the last operation was performed.—Dr. F. Parkes Weber contributes Further Remarks on Cystic Dilatation of the Common Bile-duct as a supplement to his paper in the previous issue.—In an article on Cases of Median Nerve Palsy Produced by Attempted Intravenous Injections of Calcium Chloride, Dr. Harley Stevens records two cases in which the median nerves had been injured as the result of intravenous injections of calcium chloride when the median basilic vein was utilised. After discussing the manner in which the injury was produced and the regional anatomy he makes suggestions which should enable similar results to be avoided in future.—In his paper on Some Pædiatric Eponyms. v. Young's Rule, Dr. W. R. Bett gives a concise account, illustrated by a portrait, of the life and work of Dr. Thomas Young, who, in his Introduction to Medical Literature published in 1813, laid down the rule regarding the dosage of medicines in childhood.—The abstracts from current literature are devoted to urogenital diseases.

NATIONAL PHYSICAL LABORATORY

THE annual inspection of the laboratory took place on June 21st. As usual the arrangements made to explain the exhibits to visitors were admirable, highly technical apparatus being demonstrated with such skill that its object, if not its mechanism, became clear to those without specialised training. We select from nearly a thousand exhibits a few which show the wide range of work in progress in the various departments of the laboratory under the general direction of Sir Joseph Petavel.

X Ray and Gamma Ray Dosage.—The method used by the earlier workers, and still in wide use for measuring the quantity or "dose" of X rays given to a patient, was to expose a barium platinocyanide pastille to the rays; this pastille changes colour under their influence. Doses which give the same colour change do not always, however, correspond in their medical effects, and a few years ago a more precise definition of X ray quantity was adopted internationally, in which the electrical conductivity produced in air by the rays was taken as basis. Difficulties presented themselves, however, in the design of apparatus for measuring X rays in the new unit, the "röntgen (r.)." The National Physical Laboratory has now developed a standard apparatus, obtainable in portable form and giving results correct to 0·5 per cent.

The gamma radiation from radium differs from X rays only by its great penetrating power consequent upon its shorter wave-length. The difficulties of measuring these rays in r. units are greater than in the case of X rays, but experiments to this end are in progress.

New Acoustics Laboratory.—This laboratory of the Physics Department is now equipped and was on view. It contains a reverberation room and a pair of transmission rooms together with associated measurement rooms, and provides unique facilities for the study of the absorption and the transmission of sound. The rooms, which are asymmetric both in plan and elevation, will facilitate the study of noise transmission and abatement in relation to the design and construction of walls and floors of modern buildings, and the testing of acoustical absorbents.

The Measurement of Colour.—A preliminary model was shown of an instrument which can determine the colour of a specimen without any colour-matching by the eye of an observer. The eye is replaced by a photo-electric cell, in which an electric current is set up by light falling on the cell.

In the system of colour measurement developed at the laboratory—and now adopted internationally—any colour is expressed by three numbers. These numbers may be regarded, in non-technical terms, as measures of the proportion of redness, greenness, and blueness which contribute to the actual appearance of the colour.

In the new instrument, the photo-electric cell "sees" the colour under test through three coloured screens in succession, and the current which it generates is noted in each case. The relative magnitudes of these currents give the three numbers which measure the colour on the international system.

The new instrument is specially useful for rapid determinations of the comparative values of similar colours.

Prevention of Collisions during Fog at Sea.—An instrument has been devised at the laboratory which will give warning on board ship of the approach of other ships in fog.

Although this is actuated by wireless signals, its operation does not prevent ordinary wireless telegraphy, even on the same wave-length. The indicator consists of a glass disc marked "Fore and Aft," "Port and Starboard." Wireless signals from a neighbouring ship cause a luminous line to flash out on the disc in the direction of that ship. If the neighbouring ship is approaching the observing ship the length of the line increases; if the ships are heading for a collision the direction of the line will remain fixed, and the course of the observing ship may be altered to avoid danger of collision.

The device will show the exact direction of a neighbouring ship in foggy weather at any distance up to ten miles.

Automatic Steering of Ships.—Another novel and useful instrument developed in the radio department indicates automatically deviation of a ship from a set course. If the deviation is to starboard a green light is lit, if to port, a red light, while a white light indicates that the set course is being accurately followed.

This "compass" employs an entirely new principle. A jet of electrons is shot out from the filament of a cathode ray oscillograph, and is deflected to the east by the earth's magnetism. Two glass thimbles are disposed so that when the ship is on her set course the electron jet is divided equally between them. As the ship deviates from her course to port or starboard the electron jet is deflected so that it enters only one of the thimbles, and the red or green light is brought into circuit according to which thimble is receiving the jet, thus showing the helmsman which correction to apply.

Known methods of remote control can be incorporated to effect automatic correction of the course.

Measurement of Length in Terms of Light.—The completed apparatus designed and constructed at the laboratory for measuring the yard and the metre in terms of a wave-length of light was on view.

The lengths of the fundamental standards of the country have now been determined in terms of a wave-length of red light. This constant is itself only about one forty-thousandth of an inch long, but it can be measured so precisely that it enables us to control the yard to less than one-millionth of an inch. The important point as regards the use of a wave-length of light in this way is that its length is invariable and can always be reproduced.

Proposals have been made to define the standards of length of the world in terms of a wave-length of light, and international agreement is being sought to this end.

Effect of Wheels on Roads.—Suitable apparatus for measuring and recording road transport forces has been designed, and it is proposed to fit this apparatus to a series of vehicles. The first vehicle, a heavy six-wheeled lorry, ready for sending on the road, is exhibited.

THE LANCET

LONDON: SATURDAY, JUNE 30, 1934

BODY-BUILD AND FUNCTIONAL EFFICIENCY

CRITERIA of physical efficiency provide a perennial topic for discussion and an opportunity for ventilating opinions which are apt to be surprisingly divergent. Those interested in the subject may recall the correspondence in the *Times* in March of last year in reference to tests proposed for selecting candidates for the crews in the University boat-race; a correspondence to which several medical men with personal and clinical experience contributed. In general it was concluded that, so far, no method of estimating exceptional physical efficiency can be accepted as satisfactory. In our present issue, Group-Captain TREADGOLD returns to this problem and applies the results of a large series of observations to a consideration of the relationship between efficiency and body-build, more particularly in the young male adult. Functional efficiency in this connexion he reviews under three headings: the capacity to endure severe or prolonged physical stress; the capacity to endure severe or prolonged mental stress; and the degree of resistance to disease. Body-build is an expression of the relationship between age, height, and weight, and is simply recorded as weight, with the expressions under-weight and over-weight according to the variations below and above the standards authoritatively accepted as normal.

The accepted entrants to the Royal Air Force fall into two distinct groups, according to whether they are likely to be trained for flying or not. The future pilots form a specially selected group and undergo a much more searching medical examination than the ordinary "airmen" recruits. From TREADGOLD'S graphs the remarkable fact appears that whereas in the latter (non-flying) group the number of under-weight men is double the number of over-weight, among the pilot recruits the figures are almost exactly reversed. This difference may be explained on the principle that the higher standard of fitness demanded in a prospective pilot results in the rejection of many who would be accepted under the less exacting requirements of general service. In addition, the candidates for flying are for the most part from a higher social class and have enjoyed dietetic and hygienic advantages during childhood and adolescence which make for a better physique. To investigate the relation, if any, between body-build and capacity to endure severe or prolonged physical strain, observations were directed to the airmen who competed in the Royal Air Force athletic championships and in such analysis a further differentiation was made into four groups: those competing in the tug-of-war contests, those in field events, those in the shorter distances on the running track from 100 yards to a quarter mile, and those in the longer distance events. Contemplation of the physique essential for such a contest as a tug-of-war prepares one to expect an overwhelming preponderance of the over-weight class. This feature is also prominent in the field events competitors, doubtless from the large contribution afforded by the "strong men" who put the weight and throw the discus and javelin. A like preponderance is evident among the sprinters, a type of athlete in whom a powerful musculature and well-developed frame are essential for the explosive maximal effort that must be put forth for a brief period. But among the long-distance runners extra body-weight must be a serious handicap, for here conservation of energy is all-important in contrast to the prodigal expenditure of the sprinter to whom expense (so to speak) is no object. Although, as has been pointed out by Dr. ADOLPHE ABRAHAMS in his investigations among the leading athletes of the world, there are a few striking exceptions to this rule, the body-build of the marathon runner is often conspicuously poor when one considers the work which is demanded. In relation to extreme physical exertion of another kind it is interesting to note that all the approved personnel of the recent Mount Everest Climbing Expedition were under-weight—a rather unexpected revelation considering the peculiar nature of the exertion with its associations apart from purely physical strain. It would probably be found that these highly specialised climbers, notwithstanding their body-build, had a large vital capacity as well as some special indefinable attribute.

The relationship of body-build to disease has an even closer application to medical work. Group-Captain TREADGOLD classifies diseases under infective (principally pulmonary tuberculosis, chronic otitis media, and rheumatic carditis), non-infective (including epilepsy and digestive disturbances), and psychic disorders (psychoses and psychoneuroses). In all three classes the under-weight subject preponderates, more especially in the first. (These figures, it must be added, refer to the general service men and not to the pilots, who exhibit differences of susceptibility from the special character of their work. It will at once occur to the critical reader that there is some disparity between these conclusions and the universal practice of life insurance offices which view the under-weight applicant as a whole with greater favour than the over-weight, whom they consider likely to live less long. The suggested answer to this is that the poorer functional efficiency of the under-weight person encourages him to lead a relatively sheltered life, and that the accompanying tendency to arterial hypotension provides a consequent immunity to some of the cardiovascular catastrophes of later life. From the point of view of sickness insurance, however, the under-weight must compare unfavourably with the over-weight in his greater liability to disease—a fact to which companies which specialise in sickness policies have not, so far as we are aware, paid any particular attention.

But although it may be correct to assume that the typical under-weight is usually of poor physique and inefficient as an athlete—with a tendency to a small heart, a narrow chest, and a poor vital capacity—it is pertinent to recall the analogy of hypotension to which TREADGOLD himself referred in a previous paper.[1] He then remarked on the existence of two distinct types, and stated that although in general a maximum systolic blood pressure below a certain level—110 mm. Hg has been suggested—carries with it physical disadvantages which are demonstrated by a generally poor physique, incapacity for exertion, a tendency to faintness and to circulatory defects and so on, yet examples are available of subjects with hypotension even below a maximum of 100 mm. who display a high degree of physical efficiency—an observation whose truth is obvious from the work of ABRAHAMS and others who have examined large numbers of athletes. It seems, indeed, that the subjects of hypotension fall into two groups: the athletic, in whom symptoms do not occur, and the asthenic, in whom failure of the vasoconstriction which normally raises the diastolic pressure in compensation for a change of posture leads to a relative anæmia of the medullary centres. It is possible that a similar differentiation into two groups is applicable also to the under-weight; but membership for the favoured class would probably be very small and select.

HOOKWORMS IN GOLD-MINES

IT is nearly fifty years since gold was discovered on the Rand, and as soon as the surface deposit was exhausted shafts had to be sunk. At first the mining was done under dry conditions, and many of the workers developed silicosis. About seventeen years ago a wet system was devised, all the underground areas being watered. Two years later hookworm disease was first recognised, and though this is a scourge not comparable in seriousness with silicosis, within seven years it had assumed alarming proportions. The heartening campaign which has been directed against it has recently been described by J. H. HODGMAN.[2]

There are 20,000 white and 200,000 black men working in these mines, whose lowest galleries appear to have an average depth of 7000 feet, or 500 feet below sea level. The average temperature in these is 75° F., so that the conditions of moisture and warmth are adequate for the development of hookworm larvæ to the infective stage. On the surface of the Rand this infection has not been detected, but, on recruitment, infection in negro labour has been discovered to the extent of about 40 per cent. and it increases with residence. Since the diagnostic technique (Willis's) has not been used in conditions which give it even the possibility of showing its best results, the real incidence is likely to be higher, perhaps considerably so. As regards what is conveniently called the soil of the mine levels, the most heavily infected spots were found to be the latrines. When these became soiled (and in Hodgman's report the original conditions are described as appalling) miners adopted expedients to avoid becoming soiled themselves; these expedients resulted in the fouling of the latrine floors, whence infection was carried along the levels by three agencies: miners' boots, rats, and cockroaches. Rats not only carry off fæcal particles, but HODGMAN confirms the fact that hookworm eggs swallowed by them when they eat human fæces are viable when passed in their own. Cockroaches diffuse the eggs by carrying them on their bodies. No hookworm ova or larvæ were discovered in their droppings, and they are dismissed as possible spreaders of infection; since, however, ASA C. CHANDLER[3] has shown that in the mines of Bengal cockroach droppings may contain viable eggs, it seems unwise to conclude unreservedly that they cannot spread infection in this way also. Not only the latrines but disused parts of the mines were fouled by defæcations, and, moreover, the native boys employed to carry sewage to the shafts used to spill it liberally on the way to these, as well as in the skips or cages which work within them.

Disinfection of the mines was attempted by a coal-tar derivative but this proved costly and unsatisfactory, for its penetrative power was limited to a quarter of an inch, and below this level the larvæ continued to thrive. By a fortunate accident W. O. FISCHER[4] rediscovered the lethal action of salt on hookworm eggs and larvæ which had been proved by J. LAMBINET in 1906. The walls and floors of latrines are now scrubbed once a week with a salt solution of at least 20 per cent. strength and at the same time a layer of salt at least a quarter of an inch thick is strewn weekly on the latrine floors. The latrine boxes and the skips are similarly treated, and the claim is made that the mines are now free from ova and larvæ, and that their underground soil prophylaxis has thus reached perfection. The predominant parasite is *Ancylostoma duodenale*, with *Necator americanus* relatively rare. In treatment thymol has been used on the exacting lines advised by BAILEY K. ASHFORD early in his experience, which involved two days in hospital with purgation and starving, though it is in fact now evident that no precautions of this sort are needed with thymol which are not equally needed with any other anthelmintic. A cure rate of 75 per cent. was recorded after the administration of grs. 60, though apparently particulation, that essential for real success, was not undertaken. The cure rate was judged by the tedious and unnecessarily repulsive method of worm collection, though egg examinations can now be made with little offence and with great exactness and rapidity. Carbon tetrachloride in doses of 3 c.cm. was rejected after five deaths had occurred in 61,000 cases. The treatment now adopted is a mixture of 2 c.cm. of this drug with 1 c.cm. of oil of chenopodium, but unfortunately the accounts of its value are not

[1] THE LANCET, 1933, i., 733, 755.
[2] Irish Jour. Med. Sci., May, 1934, p. 203
[3] Indian Medical Gazette, 1924, lix., 533; 1925, lx., 105.
[4] See THE LANCET, 1928, i., 1043.

exact enough for appraisement, and the dose of carbon tetrachloride is greater than that which has proved fatal elsewhere. Nevertheless Dr. HODGMAN reports a very fine achievement in preventive medicine, one which should encourage like attacks on hookworms, not only in mines but on the surface, in other parts of the world where native labour is under control. It is probable by that as a result of such demonstrations in the course of years simple measures of this nature will be accepted or enforced by public opinion.

SYMPATHETIC OPHTHALMIA

To illustrate the course of sympathetic ophthalmia and its treatment at various stages Prof. ADOLF JESS, of Giessen, records and contrasts three cases.[1] The first, which is characteristically tragic, is that of a 26-year-old non-commissioned officer in whom a splinter of granite caused a perforating wound of the left eye followed by prolapse of iris. Two days after the injury the splinter was removed and the iris was replaced, but after three weeks in hospital there were signs of irritation in the right eye which led the surgeon to propose excision of the wounded left one. The patient, unfortunately, would not agree to this until he had taken his discharge and visited his home; and when, two days later, he again came under an eye surgeon, it was already too late. The signs of sympathetic disease were no longer doubtful, and though the exciting eye was promptly excised the sympathising eye went from bad to worse; so that, despite energetic treatment for a year the patient ultimately became blind. JESS's second case is very different both in origin and outcome. In the first place, the condition developed from a perforating gonorrhœal corneal ulcer in the exciting eye. A prolapsed iris was cut off and the injured right eye covered with conjunctiva, but after 12 weeks there were signs of sympathetic disease in the left. The exciting eye was removed and in microscopical section showed typical infiltration of the whole uvea—an appearance indistinguishable from that caused by tuberculosis. In this case, ten months' treatment of the sympathising eye resulted in cure with complete restoration of vision. The third case was one of cataract extraction with post-operative iritis which quieted down completely with full restoration of vision. Two years later there was typical sympathetic ophthalmia of the second eye, and after more than a year's treatment this had to be enucleated. Here it was the (presumably) exciting eye which remained quiet and retained good vision.

These histories show the kind of problem encountered. One thing at least is certain—namely, that when an eye has been so badly injured by a perforating wound that it is practically useless, it ought to be excised as soon as possible to avoid the danger—even if apparently remote—of complete blindness. This rule holds even in cases where the injured eye shows no signs of inflammation. When, on the other hand, the injured eye retains vision it is hard to lay down the law, and the decision may be very difficult indeed. The earliest time at which the second eye can be affected is generally taken to be about fourteen days, and it is from then until about the eighth week after the original perforation that there is greatest danger.

Even if the originally injured eye has been enucleated during this period it is possible for the second eye to be affected, but it may usually be considered safe if four or five weeks have elapsed from the enucleation of the first. Where the decision is taken not to excise the injured eye, because it retains good vision, the closest possible watch must be kept on the other for signs of impending ophthalmia—such as ciliary injection, turbidity of the aqueous and commencing deposits on the posterior surface of the cornea ("K.P."), this last being a sign that sympathetic disease has actually started. Once the disease has appeared in the sympathising eye, any treatment short of excision of the exciting one will probably be unsuccessful; but if the exciting eye is excised and the virulence of the infection is not excessive, there is a chance of a good ultimate result, as is illustrated by JESS's second case. His third case, on the other hand, is an instance of an exciting eye making a good recovery while the sympathising one goes to the bad and has to be excised.

In recent years two great aids to diagnosis of sympathetic ophthalmia have been used. One is the blood count; for it is found that in genuine cases there is a great increase in the number of large mononuclear cells in the blood as in malaria, this being an indication for the energetic employment of salvarsan or kindred arsenical injections. Acting on this knowledge Mr. MALCOLM HEPBURN defends the retention of many possibly useful wounded eyes when the blood count is normal.[2] The second help is the slit-lamp. Mr. HARRISON BUTLER[2] maintains that the first sign of impending sympathetic is the presence of moving cells in the aqueous or retro-lental space, and this can be detected by a surgeon skilled in the use of the slit-lamp long before more unmistakable signs are present.

AUDI ALTERAM PARTEM

FOR about 90 years this injunction that in debate both sides must be heard was prefixed to our columns of correspondence, and sentiment might well have led us to use the words as a common title to the two articles appearing on pp. 1414–15, in which are stated the arguments for and against the abolition of compulsory vaccination for infants. The difficulties inherent in questions of a controversial sort would, it was felt, be simplified if both sides obtained a simultaneous hearing. The advocates might or might not produce *rapprochement* between themselves, but should certainly afford

[1] Münch. med. Woch., May 25th, 1934, p. 786.

[2] Trans. Ophthalmol. Soc., 1926, xlvi., 242.

the rest of us valuable assistance in making up our minds, by testing the reasons, so far as they are yet established, for taking one view or the other. The discussions are succinct. Sentiment and tradition will ever influence intelligence, and Heaven forbid that such influence should disappear as worthless, but it is good that its force should be corrected by argument, so that action may follow on what, at any rate for the time being, appears reasonable. We believe readers will see that in the debate published this week the opposing speakers are not so far apart in their teachings as would be suggested by the conversations of the public.

The contrasting of written views is just now a commonplace technique in detective fiction, and no apology is needed for allusion to the methods of this popular form of literary activity although serious matters are under consideration. It is understood that the greatest minds to-day seek relaxation in the pages of these stories, thus following Bismarck whose favourite author was Gaboriau—or so we are always informed. But more dignified and venerable authority can be cited for the method of dialectic comparison. It is the method of Socrates, who, while he left to his great disciple the writing and expansion of the ideas, conducted his own courses of verbal instruction by the balancing of pros and cons. Taking either side, and regarding the putting of questions and the supplying of answers as the one way to advance knowledge, he was able to cancel or modify opposing theories; and, while protesting against the pursuit of knowledge for its own sake, he strove to arrive at generalisations through the establishment of particular propositions. That is the spirit in which the problems which lie before medicine should be approached, and it is the spirit which is growing up among modern seekers of the truth; and they, as we were reminded by a recent Harveian orator, are following, consciously or not, Greek example.

Presentations of controversial issues, similar to that published this week, will appear in our pages from time to time as occasion suggests, and the information so afforded will show on what sound grounds medical men may differ, while holding similar ideals for the advancement of the truth.

ANNOTATIONS

HEREDITY AND DISEASE

THE Buckston Browne prize essay for 1932 has been published[1] in book form with a few minor alterations. It consists of four sections, dealing generally with the history of medical genetics, modern methods of study in human genetics, original data collected by the author to illustrate some of the principles enunciated in the preceding section, and, finally, the future of human genetics and the relation of medicine to eugenics. It is hardly an introduction to the study of human genetics which will make an appeal to the general practitioner of medicine, who would be mystified by a great deal of special terminology which the author is not at pains to explain. But the serious student of genetics will find it stimulating, for Dr. Penrose brings to his own subject an extensive knowledge also of algebra and of clinical medicine, besides a ready pen and much special erudition.

So far as human hereditary diseases are concerned, it covers a small field. The future of human genetics, we are led to suppose in the last chapter, is rosy. "One of the chief aims of human genetics is to identify as many as possible of the Mendelian characters of man and to allocate the positions of those characters on the chromosomes." This aim, the author thinks, will ultimately come near to realisation through the extensive use of laboratory methods, serological and chemical, such as those which have been employed to demonstrate the heredity of the blood groups. But what will be the benefit to medicine of the mapping of the human chromosomes? Not great, says Dr. Penrose, who belongs to the school which lauds the method of human genetics but disparages its possible results. Genetic methods, according to him, may be useful in reducing somewhat the incidence of dominant autosomal and sex-linked characters, which cause such grave diseases as epiloia, split hand, and Huntington's chorea—all rare, be it noted. "But generally speaking," he says, "it is unwise to be unduly optimistic about the results of eugenic measures in medicine." The general effect of the book is therefore somewhat disappointing. The principle of random mating is introduced with a flourish as "one of the most valuable concepts in human genetics." Yet the proposition, is admitted that "human beings do not mate entirely at random." Gentlemen, we have been reminded, prefer blondes. Jews like to marry Jews and Catholics Catholics. As a rule people marry into the same social class as themselves, this being arranged by the parents in France. Geographical propinquity also plays a part. And the situation among primitive tribes, with their systems of marriage taboos and exogamy, is even less favourable to the theory of random mating. In fact, in practice, though not in theory, human mating is anything but random. The introduction of the principle of random mating is followed in most books on human genetics with the emission of a cloud of mathematical confetti, by which the reader is so impressed (or stupefied) that he fails to see that, under a façade of flawless algebra, dubious premises are surreptitiously concealed. Dr. Penrose kindly spares us most of the algebra, which, in a book with a clinical orientation, is a good thing, seeing that the principle of random mating (or at least the algebra) is chiefly concerned with recessive and sex-linked rather than dominant abnormalities for the prevention of which, according to Dr. Penrose, little is to be expected from genetic methods.

Despite the relative uselessness of these methods in preventing disease the help of the medical profession is earnestly solicited in the preparation of authentic pedigrees, in order, presumably, that the human chromosomes may be mapped. If Dr. Penrose's low estimate of the clinical value of the results is correct, the medical profession might be justified in contending that its energies could be better employed; but in our opinion he is unduly pessimistic about the possible results of genetic methods in preventive medicine. In fact some of his own researches, unquoted in this book, suggest how they could profitably be used. To give only one example: they are applicable to the

[1] The Influence of Heredity on Disease. By Lionel Penrose, M.A., M.D. London: H. K. Lewis and Co., Ltd. 1934. Pp. 80. 5s.

subcultural group of mental defectives, which, according to Dr. Penrose, comprise about a quarter of the total inmates of the Royal Eastern Institution.

ANTIMONY IN ENAMELLED WARE

THE Ministry of Health has published a report [1] by Dr. G. W. Monier-Williams on the risks of antimony poisoning when enamelled vessels are used for the preparation or storage of food. Outbreaks of antimony poisoning have arisen from the preparation of lemonade in such vessels, whether real lemons were used or so-called lemonade crystals in which tartaric acid replaces the natural citric acid of the fruit. There is no reason except cheapness why antimony should be found in enamelled ironware, since oxide of tin is a better material for giving the enamel the desired opacity. Tin is, however, the most expensive of the base metals and the use of antimony in its place may lessen the cost by 3 or 4 per cent. (say ¼d. in the shilling) which would hardly be a sufficient inducement to the purchaser if aware of the serious effects of antimony poisoning. It is clear, from the evidence adduced by Dr. Monier-Williams, that the trioxide, Sb_2O_3 is more dangerous than either the tetroxide Sb_2O_4, or the pentoxide Sb_2O_5. The trioxide or sodium metantimoniate, $NaSb\ O_3$, is the only compound actually used, but as the enamel is subjected to a high temperature in the process of fluxing it on the iron of the vessel, all three oxides may actually be found in the finished article and in fact were so found. The question of immediate interest is not how much antimony a glaze contains, but how much it is likely to yield to food or drink prepared or stored in vessels coated with it. Two classes of tests were therefore done on hollow-ware articles found to be made with antimonial glaze: (1) analysis of the glaze itself; (2) estimation of the amount of antimony going into solution after allowing hot 2 per cent. tartaric acid to stand in the vessel for one hour with occasional stirring. It is noteworthy that the amount of antimony dissolved from the glaze, whether expressed as volume concentration in the acid solution or as weight per unit of surface exposed to its action, bore no constant ratio to the total amount found in the glaze detached from the vessel. This is no doubt partly due to the fact that a variable amount of the undercoat, which does not contain antimony, is usually chipped off with the actual glaze. Of 11 enamels examined 2 contained less than 1 per cent. of antimony in all states of oxidation, 3 between 1 and 2 per cent., 2 between 2 and 3 per cent., 1 between 3 and 4 per cent., 1 between 4 and 5 per cent., and 2 about 6 per cent. One small jug containing less than 1 per cent. yielded no antimony to tartaric acid; a large jug containing 2·1 per cent. yielded 138 mg. per litre, or 15·65 mg. per square decimetre (this was one of a batch which had caused poisoning at a London hospital); whilst a pie-dish containing over 3 per cent. gave 79·2 mg. per litre or 9·45 mg. per square decimetre, the antimony extracted being mostly in the form of the poisonous trioxide. The effect of repeated treatments with acid was not studied and it is conceivable that as the surface became rough the area of exposure would be increased and more antimony extracted. Having regard to the cases of poisoning (though happily none proved fatal) the prohibition of antimony in all classes of hollow-ware which might be used for food does not seem unreasonable. Some firms have used antimony compounds which they believed to be insoluble, and in some cases the antimony seems to have entered the glaze as an unsuspected impurity. But this circumstance affords little satisfaction to people who have been brought almost to death's door.

[1] Reports on Public Health and Medical Subjects, No. 73. H.M. Stat. Office. 4d.

MORTALITY FROM PERNICIOUS ANÆMIA

FROM time to time various workers have brought forward figures suggesting that the incidence of pernicious anæmia differs between races. In particular it has been stated that the disease is unduly prevalent in the temperate zones of North America, Northern Europe, and the British Isles. In the minds of other observers there has been considerable doubt whether race really does play any important part in the distribution of its incidence and mortality. A recent study by Dr. Richard Friedlander [1] of 500 cases admitted to the Peter Bent Brigham Hospital (Boston, Massachusetts) between 1913 and 1932 appears to favour the existence of national differences. Of all the patients admitted to the hospital during the period of the survey (over 80,000) 0·62 per cent. had pernicious anæmia; subdivision by nationality shows that over 1 per cent. of the patients from Canada, Sweden, and Denmark had the disease and over 0·7 per cent. of those from Ireland and England as compared with only 0·18 per cent. of those from Russia, 0·17 per cent. from Italy, and 0·06 per cent. amongst negro patients. The weakness of this type of evidence lies in the absence of all knowledge of the type of population from which the cases are drawn. Mortality from pernicious anæmia shows, as may be seen in the statistics of England and Wales, a steady and considerable rise with age and an appreciably higher incidence in the female sex. In other words a population consisting of persons in the older age-groups, or with a preponderance of females, will certainly show a higher incidence than a young population. If, for instance, the Russian patients in the hospital are drawn from a young immigrant male population, their incidence of pernicious anæmia is certain to be low. For a convincing solution of the problem case-rates at ages are essential; proportional rates such as those quoted above cannot be more than suggestive. That they may be fallacious is indicated by a comparison of the figures given by Friedlander for England and Scotland. Of the English patients admitted to the hospital 0·88 per cent. suffered from pernicious anæmia, while of the Scotch patients there were 0·43 per cent., or only half as many. Yet study of the death-rates given in the reports of the Registrars-General for England and Wales and Scotland shows that in fact the Scotch suffer consistently higher rates than the English at every age, and at all ages have a rate over 30 per cent. above that of England and Wales.

Such a complete reversal of the real position in this case makes the validity of the other national differences very doubtful. Friedlander's own opinion is that not only is predisposition to the disease racial in character but that it is largely confined to those individuals with a diathesis characterised by a fair complexion, light hair, blue eyes, and achlorhydria. It should be possible to collect satisfactory evidence on the importance of constitution. An analysis of 51 cases, 36 of which were autopsied prior to and 15 since the advent of liver therapy, showed no change since the introduction of this method of treatment in the weight of the liver, but the earlier group showed a greater weight of the spleen than those treated by liver. Of all cases treated with liver since

[1] Amer. Jour. Med. Sci., May, 1934, p. 634.

1926, about 11 per cent. were known to have died. The definite decline in mortality in this country that followed in 1928 the introduction of the Minot-Murphy method of therapy was demonstrated by P. McKinlay.[3] Between 1921 and 1927 the standardised death-rate was, he found, to all intents and purposes constant. In 1928 an appreciable fall was recorded for both sexes, and this improvement in the comparatively short space of time succeeding the introduction of liver therapy naturally raised hopes of a still further decline in the death-rate when the treatment was extended to a still larger number of patients.

These hopes have unfortunately not been fulfilled. Since 1928 the rates (standardised for age) have steadily risen again and in 1932 were only approximately 15 per cent. below those registered in the three or four years preceding the new treatment. Comparison of the death-rates age by age shows that in 1928, when the treatment was widely adopted, the mortality was appreciably lower than in 1927 in each decade of life from 25 years onwards. Yet in 1932 the mortality of females in each age-group was more unfavourable than that recorded in 1928, though at ages 25–65 it is still much lower than the mortality in 1927. At ages over 65 years the females in 1932 have even higher death-rates than in 1927, the year in which liver treatment was introduced. Amongst males, the death-rates at each age over 45 are considerably higher in 1932 than in 1928, though only in old age, over 75 years, does the rate exceed that registered in 1927.

The fall in the death-rate that immediately followed liver treatment was very striking. The subsequent lack of improvement, and in most age-groups an actual deterioration, is a problem which demands attention. If, as Dr. L. J. Witts suggests on another page, the prognosis of pernicious anæmia is chiefly determined by the care and skill of the physician and the coöperation of the patient, it should be possible to reduce the death-rate considerably. Probably the most common mistake is under-dosage. It is heartening to note the opinion of one so experienced in the treatment of pernicious anæmia as Dr. Witts that if certain precautions are taken "a patient with pernicious anæmia probably has the same expectation of life and physical well-being as his fellow men."

INFLUENZAL MENINGITIS

SINCE the first authentic case of influenzal meningitis was described by Slawyk[2] in 1899, a considerable number of other workers have studied the disease. T. M. Rivers [4] in 1922 was able to collect records of 220 cases, while F. E. Koch and E. Krämer [5] in 1931 increased this number to 298. The disease must, however, be considerably more common than these figures would suggest. Recently Neal, Jackson, and Appelbaum [6] have reviewed 2727 cases of meningitis which they have seen in the past 23 years, and of these no fewer than 111 were due to the Pfeiffer bacillus. In its clinical and pathological manifestations influenzal meningitis presents a curious uniformity. By far the greater number of cases occur in infancy and early childhood, 60 to 80 per cent. being in children under two years of age. Most often the disease appears to be primary, though preceding or concomitant conditions, such as pneumonia or otitis media, which are by no means necessarily due to Pfeiffer's bacillus, are often observed. The symptomatology closely resembles that of meningococcal meningitis, and one of the most frequent initial symptoms in infants is gastro-intestinal disturbance. The cerebro-spinal fluid is under pressure, is cloudy or purulent, has a high cell content, especially of polymorphs, and shows a variable increase in protein and often a marked decrease in sugar. Gram-negative bacilli, with the typical Pfeiffer morphology, sometimes accompanied by long thread forms, are seen microscopically, and can usually be cultivated on suitable media. The same organism can often be isolated from the blood stream, and from the purulent joint exudates which are sometimes observed as a complication of the disease. The organisms produce indol and resemble Pfeiffer bacilli of respiratory origin very closely. They differ from these, however, in their high pathogenicity for laboratory animals. Injected intraperitoneally into rabbits, guinea-pigs, rats, and mice, they frequently give rise to a fatal septicæmia and to purulent effusions in the serous cavities.

The disease is often prolonged, lasting usually 10–20 days, and having a very high mortality-rate—somewhere about 95 per cent. This fact renders all the more interesting the two cases, recorded in our present issue by Dr. S. C. Dyke and Dr. C. J. H. Little, both of which made a perfect recovery. Whether this was connected in any way with the age of the patients, 22 years and 8 years respectively, it is impossible to say. It is noteworthy that the meningeal infection seems to have been relatively mild, for in neither case were the organisms found microscopically in the cerebro-spinal fluid. The treatment of the disease has so far proved disappointing. In the United States the tendency is to perform frequent lumbar punctures and to inoculate anti-influenzal serum both intrathecally and intravenously.

SCIENTIFIC RESEARCH AND SOCIAL NEEDS

AT the suggestion of the B.B.C. Mr. Julian Huxley went on a tour through Britain to see what science was doing for human life; this led to a dozen wireless talks which have now been published in book form.[1] He considers in order the influence of scientific research in our universities and institutes on food, building, clothing, health, communications, war and international relations. The descriptive chapters contain a wealth of interesting though scrappy information about the recent applications of research to industry of various kinds; interspersed among them are four real or imaginary and rather tedious conversations wondering what it all means. The tone and atmosphere of the whole is perhaps best shown by the author's own conclusion as stated in the preface: "I became more and more impressed with the fact that both our existing structure of civilisation and our hope of progress are based on science." What exactly is meant by "science" is not clear; presumably an attitude of mind which prefers to have tolerably sound reasons for its beliefs and, where possible, to test them by experiment. If empirical experience is ruled out, then the word "fact" which Mr. Huxley glibly substitutes for "notion" is quite out of place; our existing civilisation is largely based on the shrewd appreciation by then ancients (and perhaps by our more remote ancestors) of such fundamentals as that fallowing increased the fertility of the soil, that close contact with excreta was objectionable, that cabbage was first-rate food, that human kindness was above rubies. "Science" may have discovered why some of these

[3] THE LANCET, 1929, ii., 1086.
[2] Zeits. f. Hyg., 1899, xxxii., 443.
[4] Amer. Jour. Dis. Child., 1922, xxiv., 102.
[5] Münch. med. Woch., 1931, lxxviii., 1131.
[6] Neal, Josephine B., Jackson, H. W., and Appelbaum, E.: Jour. Amer. Med. Assoc., 1934, ciii., 513.

[1] Scientific Research and Social Needs. By Julian Huxley. London: Watts and Co. 1934. Pp. 287. 41 plates and 8 text figures. 7s. 6d.

things are good, but it certainly did not find out that they were good nor is their incorporation into daily life due to its advocacy. What Mr. Huxley probably means is that, especially in recent times, deliberate scientific investigation has enabled many alterations to be made in the surface details of life. With this everyone will agree and almost everyone will be grateful for better food, better houses, better health, and the generally easier and richer existence which has become available. We deprecate, however, his implication that "science" is all that is necessary for salvation; it makes its substantial contribution to our comfort and convenience, but he claims too much for it; good men are useful too.

RESEARCH IN BACTERIAL CHEMISTRY

THE Medical Research Council announce the inauguration of new arrangements for further combined chemical and bacteriological investigations into the conditions which govern the life and multiplication of micro-organisms causing disease. These have been made possible by the generous coöperation of the Middlesex Hospital medical school, the trustees of the late Lord Leverhulme, and the Sir Halley Stewart Trust. Accommodation and facilities are being provided at the Middlesex Hospital in the Bland-Sutton institute of pathology and the adjoining Courtauld institute of biochemistry. The investigations will be directed by Dr. Paul Fildes, F.R.S., who has been appointed a member of the scientific staff of the Medical Research Council. The other workers are Mr. B. C. J. G. Knight, with a Halley Stewart research fellowship, and Dr. G. P. Gladstone and Dr. G. Maxwell Richardson, holding Leverhulme research fellowships. The arrangements took effect on June 1st, and the support given by the coöperating bodies is sufficient for an initial period of five years.

A BEQUEST TO A NON-EXISTENT HOSPITAL

IT is unfortunate that people who mean to leave money to a hospital should, in making their wills, sometimes use such an inexact description of the hospital as to defeat their generous object. A fresh case of this kind came to light last week on a summons before Mr. Justice Bennett. Thomas Stanley Forshaw, who died in 1930, left property (subject to a life interest) unconditionally to "the Middlesex Children's Hospital, Middlesex-street, London, W." What did he mean? There was in Middlesex no "Middlesex Children's Hospital." There was a Middlesex-street in London, but not in "London, W.," and there was no hospital in Middlesex-street. Consequently, as the judge remarked, there was no institution which bore the name or the address to be found in the will as the institution to which Mr. Forshaw gave the property. The Middlesex Hospital in Mortimer-street was able to show that Mr. Forshaw had taken an interest in its work; the evidence, it was suggested, pointed to the conclusion that Mr. Forshaw had the Middlesex Hospital in Mortimer-street in mind when he made the bequest. The judge, however, did not find the evidence conclusive. There remained a legal question to be decided—did the legacy fail and did the property pass to the next of kin as on an intestacy or would the court apply what is known as the *cy-près* doctrine? This mysterious-looking law-French expression means that the court will try to get so near (*si-près*) to the testator's intentions as it can; it will give an approximate interpretation to the language he has used. But courts are not prepared to apply the *cy-près* doctrine unless satisfied that the testator meant to benefit a particular charitable purpose rather than a particular institution. Mr. Justice Bennett declared himself not so satisfied. He found himself without any clue to Mr. Forshaw's intention apart from the words which named "The Middlesex Children's Hospital, Middlesex-street, London, W." As the address of a particular institution was so specifically set out in the bequest, the judge felt obliged to hold that the testator had an institution in mind and not a purpose. In the circumstances, the judge concluded, it was impossible to find the institution. The legacy therefore failed and the property went to the next of kin as if on an intestacy.

THE USE AND ABUSE OF A SALT-FREE DIET

FOR many years the salt-free régime has been used as a therapeutic measure particularly in disorders of the kidney. A series of communications from a score of continental physicians on the indications for and against this treatment appear in a recent issue of *La Vie Médicale*.[1] It is generally accepted that the use of salt-free diets arose from the work of Widal in France and Strauss in Germany. Widal found that in patients with œdematous nephritis salt administration increased and withdrawal of salt decreased the amount of œdema. In many cases this relationship was found to be so definite that variations in the degree of œdema could be produced at will by altering the intake of common salt, and the treatment of œdema by a salt-free diet achieved widespread and deserved popularity. Unfortunately this success in cases of dropsy led to the indiscriminate use of salt-free diets in other disorders. In chronic œdematous nephritis the value of a salt-free diet in reducing œdema is scarcely disputed. Many ambulant cases of chronic nephritis with swollen legs and puffy faces can be kept free from these discomforts merely by restricting the intake of common salt. Often it is enough if no salt is used in the cooking or at table, but sometimes it is also necessary to recommend salt-free butter and bread. In cases of dropsy so severe that the patient is bedridden a salt-free diet usually removes some but not all of the œdema.

Any amelioration of œdema is appreciated by the patient. In a prolonged, trying, and often hopeless illness it provides what appears to be tangible evidence of at least a partial recovery. In mild cases it allows the patient to undertake more bodily activity and in severe cases often relieves the mechanical discomfort due to stretching of the skin and subcutaneous tissues. Moreover, the complications of sepsis in œdematous limbs and of pulmonary œdema occur less frequently if the accumulation of large dropsical effusions is limited by a salt-free diet. While patients are usually more comfortable on a salt-free diet, however, it is doubtful whether this régime produces any durable improvement in their health, and it is therefore important to know whether any disadvantages are attached to its enforcement. In 1928 L. Blum observed in certain cases of nephritis a marked increase in blood-urea, previously normal or but moderately raised, when salt was withdrawn from the diet. It is scarcely surprising, therefore, that many physicians hesitate to recommend this diet to patients who already have a tendency to nitrogen retention in the blood. It seems, however, that, in chronic nephritis with œdema, nitrogen retention rarely in practice gives rise to the symptoms which are usually associated with a failure to excrete the products of nitrogen metabolism. A salt-free diet often causes loss of appetite and, it is said,

[1] La Vie Médicale, April 25th, 1934.

digestive disturbances. The loss of appetite is in part due to the lack of taste in the food and may recover almost at once when salted food is given. In a few cases there may be a genuine interference with the digestive function. Nervousness, twitching movements of the skeletal muscles, and headache are also said to develop as a result of a salt-free diet. These symptoms do not, however, arise frequently, and when they do occur in nephritis it may well be that they are the results of early uræmia and not of salt deficiency.

A salt-free diet has been recommended in œdema due to causes other than chronic parenchymatous nephritis. Thus in dropsy due to congestive heart failure it appears that a reduction in the intake of salt decreases the rate at which the fluid accumulates and in some cases hastens the removal of œdema and ascites. The use of a salt-free diet in non-œdematous cases of nephritis as a rule is to be condemned, because there is no clear evidence of its value and because the nitrogen retention and the digestive disturbances which may attend its use may cause discomfort if not actual harm to the patient. A possible exception to this rule is in a condition called "chlorurræmia," where there is an accumulation of chlorides in the blood. Chlorurræmia occurs in non-œdematous cases of nephritis, and in these cases the high plasma chloride upon which the diagnosis depends can be reduced to normal limits by diminishing the intake of salt. Whether anything is to be gained by this procedure is not yet clear. In essential hypertension a salt-poor diet frequently produces a fall in the blood pressure. There seems to be no objection to its use, though the mechanism of this process is unexplained. The treatment of epilepsy by bromides may be reinforced by a salt-free diet, the chloride of the body is replaced by bromide and less of the bromide is excreted. It should be remembered in this connexion that the use of a salt-free diet in combination with bromide is equivalent to increasing the dose of bromide.

THE ORDER OF ST. JOHN

THE occurrence this week of the general assembly of the Order of St. John of Jerusalem reminds us of the close association between the Order and the medical profession, alike through the control of the ophthalmological hospital at Jerusalem and the organisation of the St. John Ambulance Brigade. After the religious service Sir John Duncan and Colonel J. L. Sleeman, respectively chief commissioners of the ambulance brigade and the brigade overseas, gave an account of the work of their departments during the past year. It was reported that nearly half a million calls upon the ambulance department at home had been made, including 17,000 motor accidents. A large number of patients had been carried by the motor ambulances of the brigade which has considerably extended the number of its divisions. The activities of the Order of St. John show that deep respect for medieval forms and formalities can accompany fine modern work for the public good.

A SERUM TEST FOR MALARIA

IN 1928 A. F. X. Henry showed that serum from cases of malaria had the capacity of flocculating melanin pigment, and that this property was apparently specific. This observation of Henry has received considerable support from the results of continental workers, but the form of melanin employed left much to be desired, since it was obtained from the choroid of an ox. Lieut.-Colonel E. D. W Greig, Dr. C. E. van Rooyen, and Mr. E. B. Hendry, working in the bacteriological department of Edinburgh University, have now succeeded in improving the technique of the test, and give a brief description of their method on another page. The melanin used by them is extracted from human hair readily obtained from the barber, and is in a stable colloidal solution, so that it can be put up in ampoules and applied in field tests. Sera from several cases of active and latent malaria respectively were found by the Edinburgh workers to give positive results, while out of 129 sera from non-malarial patients all except two proved negative. The future of this test will be watched with interest, as a trustworthy but relatively simple serum reaction for malaria would prove of great practical utility.

THREE professorial appointments in the British Post-Graduate Medical College, at Hammersmith, are announced in our news columns. Prof. F. R. Fraser and Prof. E. H. Kettle are leaving St. Bartholomew's Hospital to occupy the chairs of medicine and pathology respectively, and Dr. James Young is coming from Edinburgh to be professor of obstetrics and gynæcology.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 16TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (last week 2); scarlet fever, 2483; diphtheria, 1186; enteric fever, 13; acute pneumonia (primary or influenzal), 863; puerperal fever, 35; puerperal pyrexia, 105; cerebro-spinal fever, 20; acute poliomyelitis, 2; acute polio-encephalitis, 1; encephalitis lethargica, 4; continued fever, 1 (Cambridge); dysentery, 5; ophthalmia neonatorum, 70. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 25th–26th was as follows: Small-pox, 5 under treatment, 0 under observation (last week 3 and 0 respectively); scarlet fever, 1571; diphtheria, 1671; measles, 1547 (last week 1750); whooping-cough, 283; puerperal fever, 24 mothers (plus 8 babies); encephalitis lethargica, 268; poliomyelitis, 2; "other diseases," 219. At St. Margaret's Hospital there were 19 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 35 (11) from measles, 8 (2) from scarlet fever, 22 (7) from whooping-cough, 43 (11) from diphtheria, 43 (7) from diarrhœa and enteritis under two years, and 35 (4) from influenza. The figures in parentheses are those for London itself.

Bradford reported the only death from enteric fever. Liverpool reported 4 fatal cases of measles, Rochdale 3, no other great town more than 2. Four persons died of diphtheria at Liverpool, 3 at Bradford and at Leeds.

The number of stillbirths notified during the week was 251 (corresponding to a rate of 37 per 1000 total births), including 39 in London.

LONDON SCHOOL OF MEDICINE FOR WOMEN.—Prof. L. N. G. Filon, F.R.S., vice-chancellor of the University of London, will present the prizes of this school in the Albert Levy hall of the Royal Free Hospital at 3.30 P.M. on Wednesday, July 11th.

LONDON HOSPITAL MEDICAL COLLEGE.—On Tuesday next, July 3rd, the Queen is opening the new students' hostel attached to the London Hospital. A week later, on July 10th, Mr. Walter Elliot, M.P., the Minister of Agriculture, will distribute prizes in the medical college.

PROGNOSIS

A Series of Signed Articles contributed by invitation

VIII.—PROGNOSIS OF PERNICIOUS ANÆMIA

THE prognosis of pernicious anæmia is chiefly determined by the care and skill of the physician and the coöperation of the patient. The treatment of the disease is simple, but the penalty of inadequate treatment is severe. It is little advantage to a patient to be relieved of his anæmia only to develop paralysis later, but this has been the fate of many during the last ten years. Avoidance of this disaster does not require any special skill, but it does entail strict adherence to the rule that sufficient effective substance must be given to maintain the blood count constantly at a normal level. Intelligent patients often learn to estimate their own hæmoglobin and look after themselves efficiently. The majority need to remain under medical supervision, so that their hæmoglobin can be tested at least once every six weeks, and so that the onset of symptoms suggestive of subacute combined degeneration, such as paræsthesiæ or rheumatic pains in the limbs, can at once be countered by massive dosage of effective substance. If these precautions are taken, a patient with pernicious anæmia probably has the same expectation of life and physical well-being as his fellow men.

The immediate prognosis of pernicious anæmia is dependent on the severity of the anæmia and the presence of nervous or other complications. When the red cell count is below one million, the hold on life is always precarious and death may occur from syncope or from a trivial infection. Patients in this condition are to be regarded as medical urgencies, which demand prompt and vigorous treatment. The only treatment to be considered is the parenteral administration of liver extract, with or without transfusion of a pint of blood. The more experienced the physician, the less recourse will he have to transfusion, which is not free from risk in these collapsed patients. The ideal treatment in emergencies is probably the slow intravenous injection of 5 c.cm. of a reliable intravenous preparation of liver, followed by the daily intramuscular injection of 6 c.cm. of one of the intramuscular extracts. The intravenous injection should be given very slowly, preferably in about 20 c.cm. of warm normal saline solution. When the count is above one million red blood-cells per c.mm., transfusion and intravenous injections should be avoided and treatment confined to the injection of 2 to 4 c.cm. of an intramuscular extract daily. Improvement is usually visible in 24 to 48 hours and the patient should be out of danger of death from anæmia by the end of a week. Diminished resistance to infections, especially those of streptococcal origin, appears to persist until the red cells rise above three million per c.mm. Intensive treatment should therefore be continued until this level is reached, and the patient carefully sheltered from the risk of infection.

When the anæmia is complicated by infection, the outlook is grave and a guarded prognosis must be given. The blood picture is often atypical in certain features, and the response to the anti-anæmic principle may be inhibited by the infection. In these circumstances transfusion may become the treatment of choice. However ill the patient may be, hope of recovery should not be too soon abandoned; I have reported the case of a man in a relapse of pernicious anæmia who contracted staphylococcal septicæmia and recovered after a very severe illness in which six transfusions were given.

SUBACUTE COMBINED DEGENERATION

In an unfortunately high percentage of cases, especially those who have relapsed through omission of treatment after previous repair of the anæmia, the presenting symptom is not anæmia but subacute combined degeneration of the spinal cord. It is not my intention to minimise the gravity of this complication and it is obvious that nervous tissue which has been killed cannot be replaced. Nevertheless I do feel that the prognosis of subacute combined degeneration is often painted in too gloomy colours. All of us are familiar with the remarkable improvement which may occur after an attack of transverse myelitis or during a remission of disseminated sclerosis. The same improvement is possible in subacute combined degeneration. The stages of the lesion are, usually, subjective sensory involvement; objective sensory involvement with Rombergism and loss of vibration sense; ataxic paraplegia; and complete flaccid paralysis, usually complicated by infection of the urinary tract. Paræsthesia, like the lightning pains of tabes dorsalis, may be a troublesome symptom to overcome, persisting after the objective signs of spinal degeneration have disappeared; apart from this, sensory changes are relatively benign and complete recovery may occur, with the return of vibration sense and tactile sensibility. Spastic changes are more serious, but many completely paralysed patients have learnt to walk again, and in rare instances an extensor Babinski reflex may become flexor. Complete flaccid paralysis is usually a terminal event, and if the urine is also infected or bedsores are present, the very gravest prognosis should be given. The treatment of these spinal lesions is intensive parenteral liver therapy, with massage, re-education, and encouragement; large doses of iron may also be employed.

OTHER COMPLICATIONS

Apart from irreparable nervous changes, complete recovery should be made from an attack of pernicious anæmia, the hæmoglobin rising to 100 per cent. or higher and the patient feeling perfectly fit. If this happy consummation is not attained, search should be made for a complication. Of these the most important are iron deficiency, hypothyroidism, sepsis, and arterio-sclerosis.

Iron deficiency is probably more common in pernicious anæmia than we have hitherto appreciated. When regeneration of the blood takes place, the iron stores of the organism are soon depleted and may prove insufficient for complete repair of the anæmia. I have gradually swung over to the view that iron should always be given in pernicious anæmia in full doses by mouth until the hæmoglobin is normal, when it can be omitted.

Myxœdema, while not common, at times coexists with pernicious anæmia, and in such cases thyroid extract is necessary to restore the patient to complete health.

Focal sepsis is not given the same importance in the ætiology of pernicious anæmia as it was ten years ago, but there is no doubt that a septic focus may inhibit the response to liver treatment, and such a focus should be sought for in refractory

patients. Refractoriness in other cases has been attributed to *arterio-sclerosis* and to disease of the liver. Some patients are certainly refractory, even though liver extract is administered parenterally. If the diagnosis of pernicious anæmia seems unquestionable, the indication is to give massive dosage of liver; C. R. Rhoads has described a patient who did not improve until 20 c.cm. of liver extract were injected daily by the intravenous route.

MAINTENANCE TREATMENT

With these reservations and qualifications, it should be possible to restore every patient with pernicious anæmia to complete health, and health should then be maintained indefinitely. The onset of subacute combined degeneration is always preventable if adequate treatment is given, as J. F. Wilkinson has so clearly shown in his large pernicious anæmia clinic in Manchester. Maintenance treatment with 1 oz. of desiccated stomach daily, or with the intramuscular injection of 2 c.cm. of liver at weekly or fortnightly intervals is now so cheap that failure to remain well is a reflection on the common sense of the patient or his adviser. Fear is sometimes expressed that the bone-marrow in pernicious anæmia may become aplastic and the patient may finally reach a stage in which he no longer reacts to liver therapy. This fear is groundless, for complete aplasia of the bone-marrow rarely if ever occurs in pernicious anæmia.

Sufferers from pernicious anæmia must ultimately die, even though they are cured of their anæmia, and evidence has been produced which suggests that they are more than ordinarily liable to succumb to carcinoma of the stomach. A. F. Hurst and others maintain that the achylia, which is the basic lesion of pernicious anæmia, is the result of gastritis from chronic irritation of the stomach, and they believe that this gastritis is sometimes a precancerous change, which terminates in a definite neoplasm of the stomach. The evidence for this theory is certainly suggestive, but not yet statistically convincing. After all, both achlorhydria and carcinoma of the stomach are common in the later decades of life, and we shall need to wait some years before we are persuaded that carcinoma of the stomach is commoner in patients treated for pernicious anæmia than in other men and women of the same age. It is wise for the physician to bear the possibility in mind and to attach special importance to the occurrence or recurrence of dyspepsia in a patient treated for pernicious anæmia. It would be wrong, however, to let the fear of malignant disease overshadow the success of the liver treatment, and at present I feel that the rather heroic programme of gastric lavage, suggested by Hurst to prevent the onset of carcinoma of the stomach in pernicious anæmia, is hardly justified.

SUBSTITUTION

Although I have spoken of the cure of pernicious anæmia, the treatment is essentially a substitution therapy, and the disease recurs when treatment is omitted. In very rare instances complete cure has taken place, the gastric secretion has returned to normal, and the patient has remained well without need for further treatment. This is so rare an event that it may for all practical purposes be disregarded in prognosis. Hurst has suggested that complete recovery of this type would be more frequent if septic foci were always removed from the mouth and throat, the stomach washed out as a routine, the diet kept bland, and the digestion aided by the prescription of hydrochloric acid. Most observers, however, are of the opinion that by the time pernicious anæmia develops the damage inflicted on the gastric mucous membrane is so extreme that there is little or no chance of its recovering the power of secreting the ferments which normally maintain the blood in a healthy state. Complete cure of pernicious anæmia will probably remain as rare as the complete cure of diabetes mellitus or myxœdema. To maintain health treatment must be continued indefinitely and with the utmost regularity.

L. J. WITTS, M.D., F.R.C.P.,
Assistant Physician, Guy's Hospital.

SPECIAL ARTICLES

LISTER INSTITUTE OF PREVENTIVE MEDICINE

(*Concluded from p. 1310*)

Work on Nutrition

DURING the last three years workers on *vitamin problems* in this Institute have devoted much time and attention to points connected with the standard adopted at the first meeting of the International Conference on Vitamin Standards and Units held in 1931. The subjects investigated have included the following:

Vitamin A: pure crystalline carotene as standard; influence on stability of temperature and of solvent used; the relative value of various methods of vitamin A estimation (Miss E. M. Hume and co-workers).

Vitamin B_1 (antineuritic): stability at different temperatures of the standard absorption product on acid fullers' earth from rice polishings (Miss H. Chick, D.Sc., Miss H. M. Jackson, and Mr. G. Prunty).

Vitamin C: suitability of pure ascorbic acid as standard in place of the fresh lemon juice previously recommended (Mr. S. S. Zilva, D.Sc., and co-workers). At the request of the Accessory Food Factors (Vitamins) Committee, the potency of ascorbic acid has been evaluated. The results obtained show that the activity of 1 mg. of ascorbic acid is equivalent to 20–30 international units (2–3 c.cm. of lemon juice).

Carotene as source of vitamin A.—Miss Hume and Miss H. Henderson Smith, in coöperation with Mrs. I. Smedley-MacLean, D.Sc., conclude, after testing specimens of coconut oil, which is used as a solvent for crystalline carotene, that the same sample of carotene dissolved in different samples of coconut oil does not always have the same biological value.

Recent researches have established the existence of many isomeric forms of carotene and of certain derivatives, all of which possess biological activity, the essential common factor being apparently the presence of an intact β-ionone ring with four conjugated double bonds attached. β-carotene differs from the other active carotenes in having two such rings and in showing at least twice their biological activity. It is necessary to establish more accurately the relative activity of β-carotene and that of the sample of carotene used as international standard, and also to ascertain the exact quantitative relation between the biological activity of pure β-carotene and the purest sample of vitamin A obtainable.

Effect of vitamin-A deficiency on the eye.—Mrs. K. Tansley Lythgoe, Ph.D. (Medical Research Council grantee), has investigated the effect of vitamin-A

deficiency on the development of the retina and of visual purple in young rats.

Mrs. Lythgoe's previous work had shown a delay in regeneration of visual purple to be one effect of vitamin A deficiency and the probable cause of the night blindness, characteristic of this dietary effect. The present work, still incomplete, indicates that defects in the structure of the retina and definite retardation of the first appearance of visual purple occur in suckling rats when the mother is suffering from a partial vitamin A deficiency. Evidence has also been obtained that administration of cod liver oil to young animals which have been deprived of vitamin A, restores the staining properties of the retina, but cannot repair any structural damage which may have occurred.

Vitamin D: origin and distribution in nature.—Miss A. M. Copping has continued her work on the origin of vitamin D in the ocean.

Further investigation of copepod material has shown that the dried material contained much more than 0·25 international units of vitamin D per gramme. This result would seem to afford a partial, if not complete, explanation of the rich depôts of vitamin D in the liver of the cod fish, which is said to feed largely on copepods at certain seasons of the year.

Evidence has been obtained that the vitamin D, which is abundantly formed when fresh green leaves are exposed to a powerful ultra-violet irradiation, tends to disappear when the material is kept, the rate of disappearance depending on the temperature.

Biological value of proteins.—Dr. Chick and Mr. J. C. D. Hutchinson have been studying the balance sheet method of studying the nutritive value of proteins.

In this method comparison is made of the relative values of proteins to maintain nitrogenous equilibrium in the adult rat. The special points of the study have been: the time required for "wash out" of residual nitrogen, when changing from high to low protein diets and vice versa; the influence of the level (proportion of total calories) at which the protein is present in the diet, the effect of heat and other agencies on the nutritive value of the protein. Most of the work has been done on caseinogen.

Pellagra.—The same workers have done experiments which provide another argument against the theory which would explain the association of endemic pellagra with the use of diets containing maize products as the staple cereal by an amino-acid deficiency in such diets. Dr. Chick and her collaborators have also examined the theory held by some authorities, that the occurrence of pellagra on diets composed largely of maize may be explained by a toxic substance contained in this cereal. Rats and mice have been reared on diets in which 90 per cent. of the calories was derived from maize products, without occurrence of any toxic symptom; nor were any deleterious effects noticed when the animals consuming these diets were exposed to ultra-violet or visible light from artificial sources.

BIOCHEMICAL INVESTIGATIONS

Calcification.—The mechanism of calcification in animal tissues has been further studied by Prof. R. Robison, F.R.S., and Dr. A. H. Rosenheim.

It has been shown that the second calcifying mechanism of hypertrophic cartilage is strongly inhibited by iodoacetate and by fluoride in very low concentrations. This suggests that the second mechanism, like the phosphatase, is enzymic in nature and that the two calcifying mechanisms may together form a complex enzyme system analogous to those of muscle and yeast.

In experiments with other tissues calcification was repeatedly obtained in aortæ of both rats and rabbits by prolonged immersion in highly supersaturated inorganic solutions. The deposits of calcium salts bore some resemblance to those described as occurring in these tissues in experimental hypervitaminosis D.

The oxytocic hormone of the posterior lobe of the pituitary gland.—The study of the chemical nature of the hormone has been actively pursued by Mr. J. M. Gulland, D.Sc., and his collaborators.

With Mr. T. F. Macrae he has begun experiments to identify the inactivating enzymes present in yeast and in trypsin preparations. They defined the criteria by which may be established the identity of a known enzyme which is suspected of inactivating the hormone. As a result of these researches it is apparent that the hormone is not proteinoid, as has been held hitherto by other investigators, but that, if it is peptide in character, its molecular weight is relatively small.

THERAPEUTIC SERA

Gas-gangrene antitoxin (B. welchii).—Within recent years an increasing interest has been taken in the serum treatment of acute peritonitis, intestinal obstruction and gangrenous appendicitis. The theory that has been formed attributes the characteristic toxæmia in these conditions to the action of the toxin of *B. welchii* and this view is supported by encouraging results that have followed the use of a specific antitoxin in this country. There are technical difficulties which complicate the methods of production of the serum. A fresh attempt has been made to simplify the preparation of the toxin and the antitoxin, and the results have been so consistently satisfactory that the methods can now be regarded as purely routine.

Serum for the treatment of poliomyelitis.—Coöperation with the Medical Research Council and the Public Health Department of the London County Council in the preparation and issue of a "convalescent" human serum for the treatment of poliomyelitis is being continued. The serum, when it has passed the necessary tests, is sent to the Western Fever Hospital, London, where early cases of the disease are admitted, and whence it is distributed for use in the treatment of patients who are in the preparalytic stage of the disease.

A new supply of serum from immunised horses has been obtained and found to possess very high virus-neutralising value in tests on monkeys. It is available for prophylactic use in contacts.

THE ECONOMICS OF MEDICAL PRACTICE IN CANADA

(BY A SPECIAL CORRESPONDENT)

THE medical profession in Canada is now grappling with some difficult problems, which have been intensified but by no means created by the economic depression. The conditions under which medical practice is carried on present features that have long been regarded by the profession as highly unsatisfactory, a view which for other reasons is shared by a large section of the general public, and the dissatisfaction has now reached a point at which even many who are ordinarily opposed to change are convinced that things cannot be suffered to remain as they are. The problems of medical service in Canada are in fact not unlike those in the United States, which have been described with great fullness of detail in the publications of the Committee on the Costs of Medical Care,[1] and they are ably summarised in an interesting paper read by Dr. Grant Fleming,

[1] See THE LANCET, 1933, ii., 614, 667, 722.

professor of public health and preventive medicine in the McGill University, Montreal, at a joint meeting of the College of Physicians of Philadelphia and the American Academy of Political and Social Science held at Philadelphia on Feb. 7th last.

CARE OF "INDIGENTS"

Perhaps the most urgent problem that now presses for solution is that of the medical care of the "indigents"—the transatlantic term for the destitute. Under the British North America Act the responsibility for providing medical care for the indigents devolves upon the respective provinces, but although some provision has been made it usually takes the form of a grant to hospitals on a per caput per diem basis for hospital maintenance, no fees for medical service being included. In Ontario the municipalities are legally required to appoint medical practitioners to treat patients who are "unable, through poverty, to pay for the necessary attendance, and who are not cared for in a public or private hospital." But, according to Prof. Fleming, many municipalities have not fulfilled this obligation, and the medical treatment of the indigent is left to the local doctors. He tells us that "the responsible authorities and the public in Canada have come to take it as accepted fact that the medical profession will give their services, without charge, for the medical care of the indigents."

As the depression deepened so the burden on the doctors increased, and their feeling that they were being unfairly dealt with became acute when the Dominion Government, deciding at last to give financial assistance to the provinces for the relief of the unemployed, announced that the assistance would be limited to a contribution towards the cost of food, shelter, and clothing. The Canadian Medical Association, in an interview with the Prime Minister of the Dominion, submitted strong reasons for their view that the federal contribution should include provision for medical care, but Mr. Bennett, though he agreed that the doctors should be paid for their services, said that payment should be made by the provinces and not by the federal Government. The provincial Governments, however, with the exception of Ontario, have declined to act without a contribution from the Dominion. The Government of Ontario undertake to pay two-thirds of the medical care of persons on unemployment relief if the local municipality pay the remaining third, and the doctors in the province have agreed to accept one-half of their usual fees. Where this scheme has been adopted it has worked well, but many of the municipalities have refused to adopt it, and much unpaid work is still done by the medical profession.

DEMAND FOR ORGANISATION

There are signs that the unfairness of the position in which the doctors are placed is becoming better appreciated by the public, who in many places have viewed with approval the efforts of the profession to secure payment for the medical care of the unemployed. But there are signs also of a growing feeling that the ordinary methods of obtaining medical care by private individual arrangements on a fee for service basis are unsuited to modern conditions. The cost of medical care in Canada as in other countries has steadily increased with the advance of medical science and the growing complexity of medical treatment, and the great majority of the population are unable out of their own unaided resources to afford adequate remuneration for medical services, at all events in a severe or prolonged illness. The public is feeling its way towards some system of paying for medical care by a pooling of individual resources.

One of the most remarkable of such systems is that adopted by the province of Saskatchewan by an Act passed in 1930, which enables a rural municipal council to frame a "by-law empowering the council to engage the services of a legally qualified medical practitioner for the municipality, at a salary not to exceed five thousand dollars per annum, and to submit the same to the electors for their approval." By June, 1933, full-time doctors had been appointed by 37 municipalities, part-time doctors by 30, and 9 municipalities had adopted the by-law but had not yet made an appointment. The Saskatchewan system, which is not limited in its operation to the care of the indigent, has spread to other provinces; municipal doctors have been appointed by five rural municipalities in Manitoba and by three in Alberta. The system appears to have worked satisfactorily on the whole, although the doctors would prefer that the conditions of medical appointments should be controlled by the provincial Governments; at all events the system has not been discontinued in any place in which it has been adopted. Free treatment for tuberculosis is available throughout Saskatchewan, and in 1920 the provincial Government began to give grants to expectant mothers. In 1931 the number of mothers receiving grants was 3020, and the total sum distributed among them was $64,116, of which $26,465 was expended on medical services, which were rendered by 1766 doctors. Unfortunately the maternity grants were discontinued in 1932 for reasons of economy.

COMPULSORY HEALTH INSURANCE

During the last few years the subject of compulsory health insurance has been much discussed in Canada, and special attention has been devoted to the British health insurance system, not with the object of finding out all that can be said against it—an attitude too frequently met with in medical circles in the United States—but from a genuine desire to profit by the experience gained by the 22 years of its operation. The first provincial Government to take up the study of the subject was that of British Columbia, which in 1929 appointed a Royal Commission on State health insurance and maternity benefits. The British Columbia Medical Association, in giving evidence before the Commission, advocated a system of compulsory health insurance which should provide a complete medical service, in which all qualified medical practitioners should have the right to participate, with free choice of doctor and payment per attendance. The Commission recommended the early establishment of compulsory health insurance in British Columbia, and the Government formed after the recent general election is pledged to introduce legislation giving effect to the Commission's recommendations.

The province of Alberta has also appointed a commission to study health insurance, and last year the commission issued an interim report stating that in their opinion: "Adequate medical services for all the people of Alberta can only be secured through the operation of a contributory health insurance scheme." The College of Physicians and Surgeons of Alberta, in laying their views before the commission, said that there was a wide divergence on the subject among the medical profession in Alberta, but added that "in our opinion a considerable majority of the profession in this province would welcome a scheme of State health insurance which would include certain important provisions"—the provisions being similar

to those formulated by the British Columbia Medical Association. The Government of Alberta have announced their intention of introducing a scheme of health insurance during the present year at a cost of $13 per insured person.

In Manitoba and Quebec the question has also been studied by representative bodies of the medical profession. In 1930 the College of Physicians and Surgeons in Manitoba and the Manitoba Medical Association appointed a joint committee to study State medical services and their findings are similar to those formulated in the British Medical Association's scheme for a general medical service for the nation. In Quebec compulsory health insurance has supporters in the profession, but there seems to be a feeling that if a scheme is introduced it should conform to the French system, in which the doctor is paid direct by the patient.

The Canadian Medical Association have instructed their committee on economics "to prepare a plan or plans for health insurance to be passed to the various provincial associations for their consideration, criticism, and suggestions." The object of the Association is to ascertain the considered views of the whole profession as a basis for action in any contingency that may arise.

A CHANGE COMING

In Canada the profession, it seems, is approaching the subject of health insurance with an open mind, and with a desire to learn what has been done in other countries, and to profit by the experience of those countries so far as it can be applied to Canadian conditions. The discriminating approval given to the British scheme by the British Medical Association has naturally had a considerable effect upon instructed opinion in Canada. Prof. Fleming believes that the vast majority of Canadian doctors now think "that a change is coming and that a not inconsiderable percentage want a change." He believes also that "the public are going to insist upon having medical care arranged for on some basis whereby they can pay for it without being unduly burdened."

It is to be hoped that Prof. Fleming will expand his paper and publish it in a form in which it will be readily available. The problems of medical service are pressing in many countries, and it will be a real help to all students of the question to know what Canada is thinking and doing to ensure that her people shall be provided with the medical care they need.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

EDINBURGH FOOT CLINIC

Lord Elphinstone, the new president, at the recent annual general meeting of this clinic declared open the newly completed theatre. The total number of treatments at the clinic during 1933 amounted to 13,633 against 10,362 in the previous year, patients coming from all parts of Scotland. Mr. Robert Stirling, in moving the adoption of the report, referred to the rough-and-ready chiropody practised during the late war when the rule was "burst the blisters and cut off the knobs" and every callosity which offended the æsthetic sense or caused discomfort was ruthlessly attacked with a razor. In the civil population, he said, they had people of all ages who threw undue stress upon their feet, ranging from the youngster who was starting work for the first time and who had to spend long periods standing, to those of sedentary occupation whose developed weight threw a great strain on the arches of the foot. It was, he said, admitted that the highest efficiency in any profession was to be found in the training centre, the best practice being carried out under the shadow of the academic walls. Attached to the foot clinic there was a school of chiropody with a two years' course of training, at the end of which students who satisfied the examiners were awarded the diploma of the Incorporated Society of Chiropodists. The school, he said, had a reputation second to none in the country, and the clinic had always worked in harmony with the medical profession. Lord Elphinstone said that to judge by the rapid development of the last ten years, it seemed inevitable that the clinic would soon require to be open every day and all day to cope with the work.

WELFARE OF THE BLIND

Under the new Act blind persons are entitled to the old age pension at 50 years of age, and local authorities have power to frame welfare schemes. The majority of them have in fact done so, and thanks to the vigorous administration of the Department of Health the care of the blind is one of the best organised services in Scotland. This year the Scottish National Federation for the Welfare of the Blind has met in Aberdeen, with representatives from some 200 centres. The Federation, which has a first-class home-teaching agency, might well take some definite steps to deal with prevention. The time is overdue for such a policy. The State is interested in prevention, since it cannot afford to lose the potential productivity of any of its citizens. Local authorities are interested because they have accepted the principle of increased aliment to the blind. Education authorities are interested, because of the heavy charge on them for the education and training of blind children. Industrial workshops and other organisations for the blind are finding their task increasingly difficult to provide work for their trainees. And the blind themselves, however successful in minimising the sense of handicap or disability, are insistent that their numbers should not be added to. A national committee with intent to reduce the causes of blindness should include officers of the federation, with representatives of government departments, local authorities, education authorities, the Association of medical officers of health, and ophthalmic societies. It might work along with the English committee or independently. Mr. Anderson, the representative of Edinburgh, was in favour of a Scottish preservation of sight committee. Dr. George Mackay, who is a member of the advisory committee appointed by the Department of Health under the recent Act, has prepared a pamphlet on the care of the eye, of which 20,000 copies have been circulated. The federation itself has brought out an illustrated leaflet in an edition of 14,000 copies. Hard words were said at the meeting about the practice of hawking cheap spectacles.

DENTAL DISEASE IN GLASGOW

At the forty-ninth annual meeting of the Incorporated Glasgow Dental Hospital Dr. J. Forbes Webster, dean of the hospital, said that Glasgow was the worst city in Britain for bad teeth. Dental caries was general among young people of 14 years and upwards. The dental profession had spent money in propaganda to educate the public, and had set aside a percentage of their funds for that purpose, but little progress would be made until the problem

had been tackled from the time a baby was born. Volume for volume, the saliva in a dirty mouth contained more disease germs than ordinary sewage; that was why a man was fined 40s. if he spat in a corporation tramcar. During the past year 45,383 teeth were extracted at the hospital, but only 8235—one out of every seven or eight—were preserved by conservation work. If only the cases came into their hands earlier the proportion of teeth saved could be greatly increased.

EXHAUSTION AND MENTAL DISORDER

In his annual report of Glengall Hospital, Ayr County, Dr. Douglas McRae states that 60 per cent. of the cases admitted during the year were found in a seriously exhausted condition requiring anxious nursing attention. This figure, which is the same as last year's, is in striking contrast with the 25 per cent. rate that prevailed before the war. Another unsatisfactory feature is the fact that, in 60 per cent. of the men and 50 per cent. of the women, the mental illness had been established for over a year before the patient was sent into hospital; the corresponding figures for the last pre-war year (1913) were 40 and 27. A study of the types of mental affection in the cases admitted during the year gives a curability of 33 per cent. (men 30, women 36), just half the number of possible recoveries among the admissions of 1909–1913. Either there is twice as much incurable insanity in the general community to-day compared with 25 years ago, or the delay in sending cases until a hopeless chronicity is established has doubled. Alcoholic excess was evident in 12 per cent. of the men and 4 per cent. of the women as compared with 51 and 10 in 1913. One gathers from the report that methods of treatment of early cases are well in advance of public opinion and possibly of private practice generally.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A CENTRAL FEVER HOSPITAL

A LETTER from the Hospitals Commission to the Dublin county council announces an important decision. The Commission has been examining the facilities for the treatment of fevers in Dublin, and has arrived at conclusions which it proposes to embody in a recommendation to the Minister for Local Government and Public Health. A scheme is to be put forward for the concentration of the treatment of fevers in a central fever hospital, controlled by a board of management. This will be representative of the public bodies on whom lies the statutory duty of providing adequate treatment of fevers, and also of the board of Cork Street Fever Hospital which has hitherto been the principal agency in Dublin by which that duty has been discharged. It is suggested that the board of management should consist of seventeen members—seven to be appointed by the corporation of Dublin, three by the County Dublin County Council, and seven by the board of Cork Street Hospital. The Commission also proposes to invite the principal medical bodies to associate themselves in an advisory capacity with the board of management. A measure of agreement has been reached with the authorities of Cork Street Hospital by which they will contribute from their assets towards the upkeep of the new hospital.

The proposals of the Commission, if carried into effect, will cause a great improvement in the treatment of fevers in Dublin. The Cork Street accommodation has long been inadequate, and many of the buildings are unsuitable. Its work was supplemented by "fever wings" at several of the general hospitals, a system which was very convenient for clinical teaching, but did not tend to limit the spread of infection. Dublin may now look forward to a really modern fever hospital adequate to its needs.

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

PREOCCUPATIONS OF PUBLIC HEALTH OFFICERS

EVERY year the health commissioners of the various States meet with the provincial health officers of Canada and the officers of the U.S. Public Health Service in Washington. The conference held this year from June 4th to 8th constituted the thirty-second annual conference with the U.S. Public Health Service and the forty-ninth annual conference of the State and Provincial Health Authorities of North America.

Much attention was given to the nation-wide epidemic of amœbic dysentery, which originated (as described in THE LANCET of January 6th and April 7th) in Chicago during the World Fair. Dr. Herman N. Bundesen reported the measures taken to deal with the outbreak, and other speakers gave an account of the defective plumbing in the hotel whence infection spread. In the basement of this building were found cross-connexions between the condenser water-pipes of the CO_2 ice machines and the sewers; and there were also two leaks in the sewer-pipes from which sewage dripped directly into an open ice-water tank! The question arose why there had been no epidemic of typhoid fever under these conditions. The only plausible explanation is that the amount of residual chlorine in the city water supply was sufficient to destroy *Bacillus typhosus* but not the more resistant *Entamœba histolytica*.

The conference went on to record in favour of universal pasteurisation of milk in the following resolution carried *nem. con.*: "The conference recommends to the American people that all milk intended for human consumption should be pasteurised."

The conference with the U.S.P.H.S. was welcomed personally by the Secretary of the Treasury (Hon. H. Morgenthau, Jr.) and was presided over by the Surgeon-General, Dr. Hugh S. Cumming, who described most profitably to the delegates his recent visit to England, and his investigation of the present administration of national health insurance in this country. Assistant-Surgeon-General C. E. Waller opened a discussion on the sanitary improvements that have been effected in various States through projects designed to relieve unemployment and subsidised by the federal government. In some of the southern States extensive and highly important drainage projects for the control of malaria have been carried through. Both there and elsewhere thousands of sanitary privies have been built, local funds supplying material, while the labour was paid from federal subsidy. These civil works projects, as they are called, have not, however, been everywhere equally successful. Sudden withdrawal of federal aid has left some communities with large stocks of material and no labour to make use of it. In other States projects have been undertaken independently of the State health department with unfortunate lack of skilled direction. Elsewhere again the State relief adminis-

tration has proved less coöperative and sanitary projects have not been approved for subsidy. In general it was felt that in an emergency administration handling such vast sums of money and spending them so rapidly some defects in organisation were inevitable.

A discussion of the two types of small-pox was opened by a paper given by A. W. Hedrick, D.Sc., Johns Hopkins School of Hygiene. Dr. Hedrick recommended the separate notification of variola major and variola minor, but this recommendation was not very favourably received. It was felt that the distinction could not always be made; that classifying variola minor as a disease of secondary importance would lead to neglect in reporting it; that the assumption that only two strains of variola are in circulation is not yet justified.

THE SERVICES

INDIAN MEDICAL SERVICE ANNUAL DINNER

Sir Leonard Rogers presided at the annual dinner of the Indian Medical Service held at the Trocadero on June 20th, when there was a record attendance of 105 officers. There were present as guests, Mr. S. K. Browne, C.B., C.V.O., Mr. F. H. Brown, C.I.E. (*Times* Correspondent for India and the East), Dr. N. G. Horner (*British Medical Journal*), and Dr. Egbert Morland (*The Lancet*). Six officers on probation—Capt. A. A. Pullar, Lt. R. D. de Soldenhoff, Lt. R. L. H. Minchin, Lt. R. R. Prosser, Lt. T. K. White, and Lt. E. Parry—attended by invitation. The other members of the Service present were as follows:

Major-Generals: Sir John Megaw, K.C.I.E., H. R. Nutt, V.H.S., G. Tate, C.I.E.

Colonels: H. Ainsworth, J. Anderson, C.I.E., R. F. Baird, Sir Samuel Christophers, C.I.E., O.B.E., F.R.S., J. K. Close, J. Crimmin, V.C., C.B., C.I.E., P. Dee, A. B. Fry, C.B., C.I.E., D.S.O., J. Fuller-Good, T. A. Grainger, C.M.G., C. R. M. Green, W. H. Leonard, C.B., K.H.P., F. P. Mackie, C.S.I., O.B.E., A. J. Macnab, C.B., C.M.G., J. McPherson, C.I.E., Sir Richard Needham, C.I.E., D.S.O., J. J. Pratt, Ashton Street, R. G. Turner, C.M.G., D.S.O., W. S. Willmore, C. N. C. Wimberley, C.M.G.

Lieut.-Colonels: W. G. P. Alpin, O.B.E., C. H. Barber, D.S.O., F. A. Barker, O.B.E., A. Buchanan, R. H. Candy, H. P. Cook, H. S. Cormack, M.C., D. Coutts, D. G. Crawford, J. M. Crawford, O.B.E., J. B. Dalzell Hunter, O.B.E., C. D. Dawes, C. Duer, H. R. Dutton, C.I.E., S. C. Evans, J. K. S. Fleming, C.B.E., C. A. Godson, M.C., G. F. Graham, V. B. Green-Armytage, A. F. Hamilton, C.I.E., J. B. Hanafin, C.I.E., H. Hingston, J. M. Holmes, E. V. Hugo, C.M.G., M. L. C. Irvine, S. P. James, I. Davenport Jones, H. C. Keates, H. Kirkpatrick, W. B. Lane, C.I.E., C.B.E., J. C. H. Leicester, C.I.E., I. M. Macrae, C.I.E., O.B.E., A. A. McNeight, E. C. G. Maddock, C.I.E., F. O. N. Mell, C.I.E., T. R. Mulroney, C. Newcomb, B. E. M. Newland, F. O'Kinealy, C.I.E., C.V.O., E. J. O'Meara, O.B.E., M. A. Rahman, H. Ross, C.I.E., D.S.O., W. S. J. Shaw, F. B. Shettle, O.B.E., G. M. C. Smith, C.M.G., W. C. Spackman, H. B. Steen, T. G. N. Stokes, H. Stott, O.B.E., J. Taylor, D.S.O., C. Thomson, E. O. Thurston, R. S. Townsend, M.C., A. G. Tressider, C.I.E., E. L. Ward, C.B.E., T. C. McCombie Young.

Majors: P. M. Antia, J. G. Bird, A. N. Bose, M.B.E., H. C. Brown, C.I.E., J. C. Chukerbuti, W. H. Crichton, J. A. Cruickshank, M.C., J. L. Donnelly, Sir T. Carey Evans, M.C., J. S. Galvin, N. H. Hume, G. R. McRobert, D. V. O'Malley, O.B.E., C. J. L. Patch, M.C., C. G. Seymour, E. A. C. Smith, H. Williamson, O.B.E.

Captains: D. C. Chopra, A. M. Fraser, R. T. Hicks, T. A. Malone, J. S. McMillan, Assa Singh, R. A. Wesson.

After giving the toast of The King-Emperor, the Chairman recalled the improvement in conditions of service in India during his lifetime, and his own efforts in the last five years as medical adviser to the India Office.

Sir Leonard Rogers said that to those like himself who entered the I.M.S. 40 years ago, pessimism about the future of the service might appear justified in so far as there were fewer opportunities for the favoured few in presidency towns to make small fortunes. But from the point of view of presenting favourable opportunities for good professional service he thought a much more optimistic view might be held. In some ways the conditions had improved: for example, on the military side, by the provision under the station hospital system of better conditions of work with increased responsibility and pay.

Another advance was in the provision of numerous whole-time and permanent medical research posts. Forty years ago there was not a single pure medical research laboratory in India except D. D. Cunningham's in Calcutta. Now good work of a practical nature was being done in the Bombay Plague Laboratory, in the Calcutta School of Tropical Medicine and in the Hygiene Institute built by the Rockefeller Foundation, in the plains in association with hospitals, and in the hill-top laboratories.

Sir Leonard went on to say that the I.M.S. did not lack good candidates to-day. He was convinced that, thanks very largely to the sympathetic backing of the India Office, the I.M.S. would maintain its traditions as the finest medical service the world had ever seen.

Sir John Megaw, in proposing The Chairman, omitted any reference to his researches, as they were common knowledge in the Service, but he recited the achievement of founding in Calcutta a research institute in the face of every possible pretext for economy and delay; an admiring business man had remarked to him: "Rogers ought to have been a company promoter." He spoke of physical activities in keeping with mental activities, which included bicycling in Bengal and catching a burglar with his own hand. His optimism for the Service was only justified, Sir John said, by the magnificent efforts which he had himself made. Towards the end of the dinner Col. J. Anderson achieved the impossible by telling some new stories and stimulated Col. P. Dee and Lt.-Col. F. O'Kinealy to tell others. The staff work of the dinner secretaries was gratefully acknowledged, Sir Thomas Carey Evans simply replying: "As long as you have enjoyed yourselves it is our reward."

ROYAL NAVAL MEDICAL SERVICE

Surg. Lts. to be Surg. Lt.-Comdrs.: L. J. Corbett and H. J. McCann.

The following appointments are notified: Surg. Lts. H. A. Clarke and H. E. B. Curjel to *President*, for Medical Dept., Admiralty.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. (D) W. R. Young to be Surg. Lt.-Comdr. (D).

The following appointments are notified:—

Surg. Lt.-Comdr. W. F. Lascelles to *Valiant*.

Surg. Lt. J. F. Heggie to *Leander*.

Proby. Surg. Lt. P. K. Fraser to *Victory* for R.N.B.

Proby. Surg. Sub-Lt. W. S. Miller to *Victory*, for R.N.B.

ROYAL ARMY MEDICAL CORPS

Maj. T. H. Twigg is restd. to the estabt.

ARMY RESERVE OF OFFICERS

Lt. P. R. Wheatley from R. Signals to be Lt.

INDIAN MEDICAL SERVICE

Temp. Lts. to be Temp. Capts.: M. Hafizuddin and K. V. R. Choudari.

Lts. W. M. E. Anderson, H. B. Wright, and J. Scott relinquish their prob. appts.

Lt.-Col. A. D. White retires.

ROYAL AIR FORCE

E. Donovan is granted a short service commission as Flight Lieutenant for three years on the active list.

Flight Lt. M. Pearson relinquishes his temporary commission on completion of service.

CONTROVERSIAL ISSUES

THE CASE FOR ABOLITION OF COMPULSORY VACCINATION OF INFANTS

THE efficacy of vaccination for the prevention of small-pox is, for all practical purposes, outside the field of medical controversy. Practical experience in the control of epidemics and the dispassionate examination of the records of outbreaks of the disease are alike convincing on the point. They likewise demonstrate that *infant* vaccination, no matter how thoroughly it may be done, merely shifts the age-incidence and reduces the total mortality among those who contract the disease; it fails to afford protection against the spread of small-pox in a community. Indeed, it complicates the administrative control of the disease by increasing the proportion of abortive, and therefore undiagnosed, cases, since many of those who have lost complete immunity retain sufficient to modify the disease almost beyond recognition. The total incidence in a community of people vaccinated in infancy, but not revaccinated, may therefore be greater than among a completely unvaccinated population subject to the same vigorous epidemiological surveillance. Hypothetically, therefore, the total death-rate from the disease may be as high or higher, although the case-mortality is substantially reduced.

These comments are, of course, made with special reference to the disease in the virulent form which has come to be called variola major. They constitute the main if not the whole case, from the scientific point of view, against infant vaccination in a community exposed to a real and constant risk of infection with variola major, and it is not a very strong one. Under such conditions no security can be assured by any other means than universal infant vaccination and periodic revaccination.

The question which besets our minds is whether the risk we run in this country is really great enough to counteract certain other disadvantages of infant vaccination, especially under compulsion. We are now largely an unprotected people in this country by neglect of infant vaccination and by loss of the immunity of the vaccinated as the result of lapse of time—although allowance must be made for the probable immunising influence of the mild type of the disease, now called variola minor, during the last ten years. Yet, although variola major has found a footing in several parts of the country, it has failed to establish itself, with the exception of the Glasgow epidemic of 1920–21. This, of course, is no guarantee that it might not flare out under conditions of increased invasiveness and if the proportion of immunes were still further reduced. We have seen, however, that its administrative control is, on the whole, easier, especially at the outset of an epidemic, if it is not complicated by the modification brought about by remote vaccination. On balance, the danger does not appear to be so great as to justify the continuance of a measure to which there is a rooted objection, whether that objection is based on solid grounds or upon mere prejudice.

Is there, then, any valid argument of a medical nature against vaccination? No reasonable person can deny that there is. Vaccinia causes a great deal of discomfort and a certain amount of malaise in an appreciable proportion of those subjected to it. It kills some of them. There is no reason to suppose that the Registrar-General's statistics in this connexion are subject to greater error than in relation to any other disease, and they show that 59 persons died of vaccinia in the ten years, 1923–32, in England and Wales. In the same period, when small-pox, in the form of variola minor, was exceptionally prevalent and several small outbreaks of variola major occurred, 226 persons died of the disease, or less than four times the number of deaths from vaccinia. The number of notified cases of small-pox (major and minor forms not distinguished) was 79,410, so that the case-mortality from small-pox was as low as 0·28 per cent. It is true, of course, that the fatality of vaccinia was far lower, for there were approximately 2,900,000 vaccinations, and the percentage case-mortality was therefore about 0·002. But the risk in vaccination is there. The larger the amount of vaccination the greater the actual number of deaths, and it is reasonable to question the right of a community to enforce it upon parents, when the other risk against which it protects the children—for a limited period of years—is so much less in total volume.

The people of this country have answered the question. Exemptions on the ground of conscientious objection have increased in number until they constituted 46·7 per cent. of all births in 1931. From 1905 to 1931 the percentage of vaccinations to births fell from 75·8 to 39·0. The decline has been continuous, with a slight interruption in the earlier years of the recent wave of variola minor, before the true character of that disease was generally realised either by the profession or the public. There is not the shadow of a prospect of a reinforcement of compulsion except in the face of a grave epidemic of variola major and then, if it were to be effective, compulsion would have to be extended to revaccination as well.

A law which is not observed is worse than no law at all. It would probably not be difficult to secure the vaccination of most of the present 39 per cent. of infants, without any power of compulsion. Undoubtedly, and naturally, compulsory vaccination when it was enforced created the attitude of antagonism to all forms of artificial immunisation which dies hard among the people. And yet it is upon such measures that we shall probably have to rely for the eradication of the air-borne diseases, such as diphtheria, scarlet fever (if it ever again becomes so severe in type as to make it worth while), measles, whooping-cough, and perhaps influenza. How can we expect parents to welcome the new prophylaxis, with its measured dosage and almost complete freedom from danger, if we continue to try—or pretend—to force them to accept the inoculation of a virus capable of multiplying itself and producing a lesion which may be the centre of pyogenic infection, and which has other fatal sequelæ?

Compulsion there may have to be from time to time. We cannot be sure that variola major will always treat us lightly as it has during the present century. The Minister of Health has power to enforce vaccination at any time or in any part of the country by Orders made in terms of Sections 130 and 134 of the Public Health Act, 1875. In fact, it would be found that, in face of a real danger the people would demand vaccination and enforcement would be necessary to quite a limited extent. It will be said that many would contract the disease and die before they could be protected. They would also if every child was vaccinated, but not subsequently revaccinated, and much more so in our present state of pseudo-vaccination. In fact, with the modern organisation of the profession, the growth of health departments, and the establishment of clinics, vaccination of the

whole community in a few weeks would not be an impossible proposition. It may more reasonably be argued that the production of the requisite quantity of lymph of the correct degree of maturity would present difficulties. It certainly would but, in practice, the country would be taken area by area, as the spread of small-pox—a disease with a comparatively long incubation period—is not rapid. The laboratories at the Ministry of Health have shown during the years 1923 and 1924 that rapid expansion of their output is possible. It will certainly be said that delay in vaccination will increase the risk of post-vaccinal encephalitis. That is the present view, although it seems to await confirmation. Some experience of the errors in death certification among young infants makes one a little sceptical on the point, and the complication is so rare that time is required for the gathering of sufficient data. In any case, it is not the most important of the fatal complications of vaccinia, and its importance would be relatively less in the presence of an invasion of variola major.

Generally, it is reasonable to maintain that the compulsory imposition of a procedure which involves some danger to health and even to life, however slight, is permissible only if it assures the protection of the community as a whole, and not merely the individual. Infant vaccination, without revaccination, affords no such herd protection. If obligatory vaccination is necessary it should include revaccination of those who have lost immunity. That, under ordinary conditions, is not practically attainable but, in circumstances of imminent risk, exercise by the Minister of his power to make such an Order would not be seriously opposed.

The truth of the matter is that compulsory vaccination against a hypothetical danger is an obstacle to the acceptance of immunisation against present risks. There would appear to be no hope of the widespread adoption of artificial prophylaxis against other diseases, so long as a living virus is associated in the public mind with the process and its use is even nominally enforced. The whole problem would be altered if a dead antigen for producing immunity against small-pox were discovered and vaccination thus brought into line with the more modern methods of prophylaxis. Even then compulsion would be more of a hindrance than a help.

THE CASE AGAINST THE ABOLITION OF COMPULSORY VACCINATION OF INFANTS

The question of compulsory vaccination was raised last year by the Council of the British Medical Association and a resolution calling for its abolition was sent to the annual conference where, however, an amendment was accepted and the Council was asked to consider the matter again. This reference back supported the contention of the meeting of the Association of Public Vaccinators whose members are regularly inside the homes of those directly concerned—that there is no general demand for any alteration of the law. Those who advocate abolition bring forward no solid argument but only a purely hypothetical assumption that entire freedom would act as a magnet towards vaccination. Experience on parallel lines entirely negatives this. What does compulsory vaccination mean in these days? It means the possibility of exerting administrative pressure where needed by statutory officials. It does not interfere with those individuals who, however misguidedly, choose to "contract out" from vaccination by the conscience clause. It also means that there exists an organisation constituted by law which keeps in operation the machinery necessary for the control of small-pox. Remove the compulsory idea and there is nothing except small-pox to prevent the population from forgetting all about vaccination. It is only the regular visitation by administrative officers which counteracts this forgetfulness or indifference, and these officers will disappear if there is no law to administer. Is it not better to have the present average of 40 per cent. (in some places over 60 per cent.) of the infants coming along vaccinated, thus putting up a barrier, even though an incomplete one, rather than have no barrier at all against small-pox? Most medical officers of health would feel much happier if they knew that there was a 40 per cent. barrier against, say, diphtheria. Backing away from compulsion will accelerate indifference and furthermore would be interpreted as meaning that vaccination was no longer necessary. The abolition of the compulsory clauses—which apparently is only called for by those behind the office desk or the laboratory bench, not by those who actually go into the homes of the people and are therefore in a much better position to judge the psychological attitude of parents to the matter—would mean that the whole matter would be left to a largely unthinking public. Though the main aspects of the question are (*a*) the municipal and (*b*) the domestic, yet the abandonment of compulsion would have both an international and a national bearing.

Internationally, if the abolition of compulsion means, as seems likely, the abandonment of all administrative pressure, the Public Health Committee of the League of Nations would find the balance of its work in connexion with the control of small-pox disturbed. One nation would have deserted and there would be a breach in the wall of solid defence which the near-by nations at any rate had set up. Their opportunities to gauge effects would be narrowed, and their orbit of observation curtailed, and this by the very nation which gave vaccination to the civilised world.

Nationally the abolition of compulsion might strain both social and commercial relations with other countries especially if small-pox continues. Moreover the steady work of the National Lymph Establishment would be unbalanced if it had only to hold itself in readiness for peak loads due to sudden outbreaks of small-pox, with only an infinitesimal weekly call and no returns bearing on the reactions of lymph. Would the nation feel happy in the knowledge that its field army of administrators and propagandists no longer existed?—for without compulsion no army would be required.

Municipal outlook.—If the individual ceases to be protected, then greater protection must be provided for the community. Epidemics will come, and all must be in readiness. There was not long ago an outbreak in Lancashire of the severer type. It is much less costly to prevent by vaccination than to overtake by hospital isolation. Once having lost the idea of the force which compulsory administration implies, both vaccination and revaccination will be spurned, and the well-vaccinated towns will involuntarily be dragged down to the level of the others. Would this be fair?

Domestic outlook.—As is well known, persons having a rooted objection to vaccination can "contract out" by making a statutory declaration. The

remainder available for vaccination can be divided into three classes :

1. Those anxious to have it done.
2. The indifferent, who await the call of the vaccination officer and after explanation of the reasons for vaccination, agree.
3. Those who say they would rather not have it done at all, but have been remiss or too indolent to get exemption. Many of these also comply after explanation.

As a last resort the vaccination officer has still the power of enforcement though it is very rarely exerted. Under a voluntary system, vaccinations would be confined to a portion of the first category only and in the absence of a general atmosphere of vaccination some even of these might recant. The voluntary system would certainly add to the number of the unvaccinated the enormous mass of the indifferent and careless. Propaganda would depend entirely on the complexion of the local governing body.

Summarising then much that has been said above, the following observations may perhaps act as pointers as to why compulsory vaccination should be retained.

1. The removal of the atmosphere of compulsion even without its legal enforcement would in the opinion of those most likely to know immediately lead to a decrease in the number of vaccinations.
2. It is the general opinion of the vaccination officials who actually go into the homes of those concerned that the compulsory clause does not now prevent a single person from accepting vaccination.
3. Public vaccinators hear no suggestion that but for compulsion parents would accept vaccination. On the other hand they are frequently told that it ought to be compulsory.
4. Abolition would immediately influence many who now regularly accept vaccination. Parents would argue that if it is not compulsory it is not now necessary.
5. The abolition of domiciliary vaccination which the dropping of compulsion implies would remove the opportunity for interviews with parents, by means of which many have been satisfied of the value of vaccination. Clinics would not provide such opportunities, and health visitors, who would not regard vaccination as their first duty, would largely fail to carry conviction.
6. The suggestion that entire freedom of choice would increase the number of vaccinations is unsupported by past experiences. When the Royal Commission suggested a conscience clause it predicted that the number of vaccinations would increase ; instead there was an almost immediate drop in the numbers in some places. Every relaxation has been followed by a decrease.
7. Judged by the very few coming forward voluntarily for immunisation against diphtheria, a disease which is still regarded with awe by most people and is seldom absent in any community, vaccination against a rare disease is even less likely to be considered in the absence of small-pox or of propaganda.
8. Removal of compulsion will react detrimentally to progress in regard to other immunisations, for it will certainly be loudly proclaimed that vaccination—the sire of all immunisations—has been found to be useless, however untrue this may be.
9. The missing of vaccination in infancy, when the chance of harmful effects is infinitesimal, will defer the primary operation to a later period when at any rate it may give more discomfort, and, anyhow, according to the last Royal Commission, the greater possibility of danger.
10. In the opinion of practitioners and officers who go into the homes of the people, there is no general demand for abolition.

Finally, once abandon compulsion, which means live administrative domiciliary pressure, and there is nothing left but the dead hand of indifference. There can be no turning back.

PANEL AND CONTRACT PRACTICE

Insurance of School Leavers

THE possibility of extending health insurance to cover children from the time they leave school was considered in our issue of May 19th (p. 1086), where comments were made on a resolution of the Birmingham insurance committee which has been circulated for comment. The proposal has since been brought before the annual conference of the National Association of Trade Union Approved Societies, and this body has decided in its favour. The conference added a rider, however, that the whole of the contributions for children of 14–16 should be paid by the employer and the State—a suggestion which would place the beneficiaries in a privileged position. In the discussion it was stated that the Government had no intention of raising the school-leaving age, and that if Unemployment Insurance were to apply between the ages of 14 and 16 it was only fair that health insurance should also be available for the same period. Of the thousands under the age of 16 who were engaged in distributive occupations many, it was urged, were in need of medical attention but could not afford it. To this the reply might be made that growth and multiplication of public medical service schemes makes it untrue to say any longer that juvenile workers cannot afford medical attendance.

As yet, however, there seems to have been no official expression of medical opinion on the subject.

Change of Doctor

The regulations on change of doctor are still inconsistent with the wishes of the profession, which has always held that a disgruntled doctor and a dissatisfied patient are best parted as soon as may be. At present an immediate change can be effected only when both practitioners give their consent or when the patient moves outside the two-mile radius of his medical attendant's practice. When a patient wishes to change doctors, without consent and without moving, he has to give at least a month's notice before the beginning of each quarter. He writes to the insurance committee enclosing his medical card, and the committee returns the card with a slip (printed in red ink and gummed to the inside) authorising the change. He takes this card, with the slip in it, to the new doctor of choice, who signs it in accepting the patient for his list, and it has then to be returned to the insurance committee by the new doctor within seven days. After registering the transfer the committee sends the insured person a new card with the new doctor's name on it. The former doctor is responsible for medical treatment up to the time of effective change—i.e., the beginning of the quarter. But as the patient is dissatisfied with him—otherwise he would not have made the change—it is unlikely that he will go to him for advice, and the probability is that he will have to pay for medical attention obtained elsewhere.

It will be seen that one local transfer involves four postages, two of which are paid for by the insurance committee, and this gives much clerical work to the committee. The London insurance committee has recently published its latest figures both for local changes—i.e., without consent and without moving away—and for all kinds of transfer in the course of the last year.

Taking the local changes first, for the quarter ending March, 1934, out of 1,786,954 insured persons on the lists of medical practitioners and institutions there were 7031 requests for change of doctor (without consent or moving away); of these, however, only 4929 were effective, for 1576 were irregular 313 being attempted out of time. In other words about 40 out of every 10,000 insured persons request this local change of doctor but only 27 carry it out in every quarter.

When we consider all the changes—i.e., the total transfers effected for all reasons in the year March, 1933–4—we find that out of an average of 1,884,526 insured persons on the medical register there were 23,319 requests to transfer of which 17,167 were effective. Reducing these to simpler figures 124 out of every 10,000 insured persons request the transfer, and for 91 out of every 10,000 it is effected. The total number of transfers by consent for the years from March, 1930 to 1934 is 38,681—not quite 10,000 per year.

The regulations provide that, save chronic illness in which he is certifying incapacity once a month, a practitioner cannot give notice to the insurance committee to have his patient removed from his list as long as that patient is ill and receiving certificates of incapacity to work; but he can give notice at any other time. The reason for this regulation seems to be fairly obvious. There have, however, been two cases recently before a medical service subcommittee in which doctors have apparently tried to get rid of their responsibility to attend an ill insured person by saying to the relatives "I cannot come," "It is too far away" (although within two miles), "I never visit in that area," "Let me have the medical card and I will sign the consent to transfer and you can then get the services of an insurance doctor without having to pay."

Practitioners under the insurance scheme are paid a capitation fee to look after their patients whether they are well or ill and to seek to transfer a patient, directly he becomes ill, to some other doctor who has received nothing for him when well is definitely unjustifiable. There may, of course, be special and quite genuine reasons why Dr. B. cannot respond immediately to a call to see his patient Mr. P., but this does not make it permissible for Dr. B. to try to transfer the patient by consent to Dr. C., nor does it justify Dr. B. telling the relatives to try to get Dr. C. to attend. What he ought to do is ring up or send a note to Dr. C., asking him to attend Mr. P. on his behalf, and he should arrange to pay Dr. C. the proper fees for doing his work.

It often becomes obvious that a patient is never likely to get on well with his doctor. If so, the best plan is to give notice to have him removed from the list before there is any trouble.

OBITUARY

ARTHUR ANDREW MORRISON, C.M.G., M.D. Aberd.

WE regret to announce that the death occurred on June 14th of Dr. Arthur Morrison, lately British consular surgeon at Alexandria, and well known in Egypt through 50 years of work as doctor and public official.

Morrison was born in 1858 in Aberdeen and educated at the grammar school of that city and Marischal College. He graduated as M.B., C.M. in 1882, and in the following year went to Alexandria as assistant to the late Sir James Mackie. In 1886, the year in which he proceeded to the M.D. degree, he was nominated R.M.O. to the State Hospital at Suez, where he worked until 1891, when he rejoined Mackie in Alexandria, and a few years later succeeded him as British consular surgeon and delegate on the Quarantine Board. He was also appointed surgeon to the Deaconess Hospital, now and since the war known as the Anglo-Swiss Hospital. This hospital received many Australian sick on their arrival at the seat of war, while in 1915 the wounded in the Gallipoli campaign soon began to fill the beds. Morrison won admiration on all sides by the strenuous way in which he tackled the administrative difficulties, and by his great skill as an operating surgeon. At the conclusion of the war he organised the Anglo-Swiss Hospital as a modern British institution, furnishing a chemico-bacteriological department at his own expense, and when at the age of 70 he retired from practice with the distinction of C.M.G., he remained a medical director of the institution and retained his delegateship on the Quarantine Board. In memory of his wife, who was the daughter of Capt. W. H. Roberts, of Suez, and whom he married during his service at that port, he founded at the hospital an anti-rabies institute which has proved of great service to the country and which will constitute a fine tribute to his memory.

DR. MORRISON
[Photograph by Albert

ALAN DEED BRUNWIN, M.D., B.Chir. Camb.

THE death occurred in St. Thomas's Hospital, London, on June 21st, of Dr. A. D. Brunwin, a consultant tuberculosis officer for the county of Lancashire.

Alan Deed Brunwin was born at Rayne, Essex, in 1879, and was educated at Felsted and Trinity College, Cambridge. He went to St. Thomas's Hospital to finish his medical training, and graduated as M.B., B.Chir. in 1906. He proceeded to the M.D. in 1909, taking also the D.P.H. Aberd., and after certain resident appointments he entered the Colonial Service as Government M.O., Fiji. He recorded his experiences there by contributions to the medical press upon filariasis and dysentery, but his stay in the islands was brief, and before the war he returned to England to act as assistant medical officer at the Westmoreland Sanatorium. In 1913 he joined the medical staff of the Lancashire county council as consultant tuberculosis officer, the appointment being held jointly with the Blackpool corporation. He joined up at the outbreak of war as a temporary officer in the R.A.M.C., and was later attached as heart specialist to the base hospital at Etaples, where he did useful work on electrocardiography. At the cessation of hostilities he was given control of one of

the five large dispensary areas in Lancashire, containing a special hospital for pulmonary diseases in that city with dispensaries at Preston and Chorley. With the coöperation of the late Dr. Logan Stewart he did interesting pioneer work in regard to the treatment of tuberculosis by artificial light at centres established in the tuberculosis dispensaries, the results of which he later published.

Dr. Brunwin will be greatly missed by his immediate colleagues and by the general practitioners of his district with whom he was always on friendly relations. He is survived by a widow and two children.

CORRESPONDENCE

INFANTILE DIARRHŒA

To the Editor of THE LANCET

SIR,—I was much interested in the paper by Dr. Maizels and Dr. Jean Smith in your last issue. The profession have been slow in recognising the importance of this subject. The authors say that the mortality in enteritis is over 50 per cent. I agree with this estimate, and would add that these cases do not do well in hospital; they are very liable to become infected with other organisms whilst in the overcrowded wards. It is, moreover, well known that enteritis cases are very apt to infect a whole ward of children which previously showed no symptoms of intestinal disturbance. I therefore think that these enteritis cases should be kept out of hospitals as much as possible and treated in the early stages in their own homes. Unfortunately the profession are not of one mind in regard to the principles of treatment. This is largely due to our ignorance of what is taking place in the child's body, and we should be grateful for any light which can be thrown on the problem by recent biochemical research. Acidosis no doubt exists, but the degree of acidosis does not seem to influence the prognosis in these cases. At what stage in the disease does acidosis show itself, and how are we to diagnose the condition clinically? It is of course quite impossible to make elaborate blood examinations in the home; it is useless to examine the urine; and by the time the child becomes restless and has air-hunger the case is probably hopeless. One fact of practical importance that emerges from these researches is that normal saline must not be given, since this increases acidosis; half-normal saline can be safely given combined with glucose. This latter practice was adopted many years ago by the clinicians, and it is satisfactory to have this opinion confirmed by the biochemist.

Ten years ago I started a scheme in North Kensington for treating cases of acute vomiting and diarrhœa in their own homes amongst those who could not afford doctors' fees. Details of the scheme appeared in THE LANCET (1927, i., 176). It was made a notifiable disease, and with the help of the district nurses the scheme has worked very well. It seemed to me that as the child was losing so much fluid from its body, and as that fluid must come from the blood stream, the obvious thing was to introduce as much water as possible directly after the vomiting ceased, with the addition of sodium chloride, as this salt forms such an important constituent in the blood. I chose half-normal saline because this is more rapidly absorbed from the intestine than full-strength saline. Bottles full of saline were given to the infant during the first 24 hours; the child was encouraged to drink as much as possible; for instance, a baby 3 months old will take a pint of fluid in the 24 hours. One teaspoonful of castor oil was given, and the bowel was washed out with saline. The next day a food low in fat and high in sugar was given. I tried at first various foods, such as diluted lactic acid milk; this, however, was not easy to prepare in the home. Protein milk was fairly successful, but ultimately I hit on malted milk, which seemed to suit these cases better than anything else. It consists of water 3·7, protein 13·8, fat 9, carbohydrate 70·8; it is a mixture of desiccated milk, wheat flour, barley malt, sod. bicarb., and contains no unaltered starch. The child is generally kept on this mixture for five or six days, and then a very gradual return is made to a well-balanced diet. At first cow's milk is added to the malted milk in half-drachm doses. The greatest danger in these cases is to prolong starvation beyond the second day. I find it makes a great difference in the prognosis if the treatment is delayed beyond the third day of the illness. The prognosis is much more favourable if half-normal saline has been taken by the mouth instead of plain water. The dehydration is enormously relieved in the great majority of cases and temperatures of 103°–104° F. gradually subside.

It was encouraging to have my clinical experience confirmed by biochemical research. In a paper which appeared in THE LANCET (1930, i., 286) on Alkalosis in Congenital Hypertrophic Stenosis, Maizels, McArthur, and Payne described the examination of 34 cases, of which 28 had an increased bicarbonate reserve at some period before operation. They say the body has need of the chloride ion. In the vast majority of cases that I have seen the vomiting begins before the diarrhœa, as they are usually infants suffering from a dietetic cause, and are probably at first at any rate suffering from alkalosis and not acidosis; hence the success of treatment in these cases where vomiting is the prominent symptom. In this district the nurses have attended 836 cases in ten years; 8 of these died whilst the nurses were in attendance, and 26 died in hospital, making a total of 34 deaths, about 4 per cent. I cannot help feeling that the death-rate from enteritis could be very greatly reduced if some such scheme as this were adopted in large towns with a good district nurse service.

I have seen occasional outbreaks of dysentery, chiefly the Sonne variety; these cases are rarely fatal. The bacteriologist can of course help us in the diagnosis of dysentery, but in most cases of enteritis no specific organism can be isolated. I have seen a great number of post-mortems on these cases at St. Mary Abbot's Hospital; the most marked characteristic was the fatty degeneration of the liver and kidneys. Very often there was no sign of inflammation in the intestine. I have seen five cases of otitis media where the diarrhœa soon subsided after the appearance of pus from the ear. I do not regard otitis media as a cause of enteritis, but as a complication.—I am, Sir, yours faithfully,

Kensington, June 26th. RONALD CARTER.

RHEOSTOSIS

To the Editor of THE LANCET

SIR,—In her interesting paper on Familial Chondrodystrophy with Rheostosis (THE LANCET, Jan. 20th, 1934, p. 122) Dr. Gwenda Hilton mentioned that

the condition of the long bones in her case differed from that first described by Léri and Joanny (1922) as "melorheostosis" in that it was bilateral and affected both upper and lower extremities. However, what I now believe to be a certain case of melorheostosis (or "rheostosis" as Dr. Hilton rightly prefers to call it) was brought before the Section for the Study of Disease in Children, Royal Society of Medicine, in May, 1920, by Dr. E. A. Cockayne (*Proceedings*, 1919–1920, xiii., 132–136) before Léri and Joanny wrote on the subject. In Cockayne's case the bone condition was *bilateral* and all four extremities were affected. The radiographic report stated: "Both femora show marked irregular thickening with formation of new dense bone throughout their length. There is a similar condition of osteitis in both humeri, especially in lower part; small local areas of thickening are present in both tibiæ and in one fibula; bones of forearms, hands and feet are normal." The Wassermann reaction in the blood of the patient (a boy, aged 9½ years) and in that of his father was negative (his mother was dead). The radiographic appearance in the femora is well illustrated by one of Dr. Cockayne's figures.

I had forgotten that Dr. Cockayne had described the case I am referring to when I first read Dr. Hilton's paper.

I am, Sir, yours faithfully,

London, W., June 21st. F. PARKES WEBER.

HYDATID DISEASE OF THE LUNG

To the Editor of THE LANCET

SIR,—In your issue of June 16th (p. 1281) Dr. R. G. Prosser Evans advocates expectant treatment of pulmonary hydatid disease, and he records a case so treated which fortunately recovered. It is, I think, unfortunate that the views of H. Dew do not appear to have been considered. Basing his judgment on an unrivalled experience in Victoria, Dew insists upon early operative interference in all subpleural cysts and only countenances expectant treatment in the case of deeply situated parabronchial cysts which are neither large or causing toxæmia. "The prognosis after operations for simple pulmonary cyst is," he writes, "universally good and the mortality is under 5 per cent.; it is not so good in suppurating cases in which the mortality varies from 15 per cent. to 20 per cent." ("Hydatid Disease," Sydney. 1928). These results have been obtained by general surgeons without any other special experience in thoracic surgery.

The inference that the operative mortality in children is unduly high cannot be allowed to pass unchallenged. Although having no personal experience of hydatid disease, I have removed successfully a pulmonary lobe from a child aged 3 years and at present have under my care a girl aged 13 years who has survived, without serious inconvenience, a resection of the entire left lung carried out nine weeks ago. The view that young subjects, as a rule, tolerate major thoracic operations at least as well—if not better—than adults, is supported by the experience of Haight, Nissen and Rienhoff [1] who have performed successfully total pulmonectomies on children, aged 13, 8, and 3 years respectively.

Thoracic surgery has made, in this country, very slow progress, and gloomy views as to its scope are likely to prove a further check if undisputed. Otherwise criticism of Dr. Evans's interesting and instructive case would be unnecessary.

I am, Sir, yours faithfully,

GEORGE A. MASON.

Newcastle-upon-Tyne, June 20th.

[1] Haight, C.: Surg. Gyn. and Obst., 1934, lviii., 768. Nissen, R.: Zentralb. f. Chir., 1931, lviii., 3003. Rienhoff, W. F.: Bull., Johns Hopkins Hosp., 1933, liii., 390.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Royal Assent

IN the House of Lords on Friday, June 22nd, the Royal Assent was given to a number of Acts, including the Workmen's Compensation (Coal Mines) Act; the Statutory Salaries (Restoration) Act; and the Birmingham United Hospital Act.

Supply of Milk to School-children

The Milk Bill was considered by the House of Commons in Committee on June 19th. Captain BOURNE was in the chair.

Sir FRANCIS ACLAND moved an amendment to provide that not less than half of the moneys provided by Parliament should be expended in repayment to the Milk Board in respect of milk for consumption by children attending public elementary schools, or by mothers, or by children under school age attending clinics under schemes approved by the local public health authority.

After some debate,

Mr. ELLIOT (Minister of Agriculture) said that the proportion of money which they would spend for the purposes mentioned in the amendment was much more like six-sevenths than one-half or two-thirds. In view of this assurance he hoped that the amendment would not be pressed, because the mere existence of these words might be taken by the bodies concerned as an indication that the House of Commons desired them to reduce the amount of expenditure on milk for school-children, and so on, and to enlarge considerably the amount spent in milk publicity.

The amendment was withdrawn.

On the question that Clause 11 (Contributions from the Exchequer towards the expenses of milk marketing boards),

Mr. ELLIOT, replying to Sir S. Cripps, who asked for further information as to the expenditure of the money to be allocated under the clause, said that he intended to work on the schemes which had been in operation for some time under the National Milk Publicity Council. Those schemes, which were now supplying something like 900,000 children with milk, were working well and by building on the existing foundation they would have the benefit of previous experience. Milk was being supplied while the children were attending school and that was the line along which the initial arrangements, at any rate, would be made. The method was to supply a separate bottle to each child with a straw through which to consume the milk. That made sure of absolute cleanliness and of slow absorption of the milk, which made it more easily digested. They had set before themselves the ideal of at once halving the price charged to schools. Milk was at present supplied at one penny for one-third of a pint, and they hoped as soon as they got the sanction under this Bill to reduce that price for the milk to one half-penny. That would apply to all those who were already receiving milk and to all new entrants. They hoped that this would act as an excellent advertisement. The extent to which they could spread the milk at one half-penny depended on the arrangements the Board were able to make with the distributors.

The clause was ordered to stand part of the Bill.

The Committee stage was concluded and the Bill as amended was reported to the House.

Noxious Fumes in London Streets

In the House of Lords on Wednesday, June 20th, Lord KILMAINE called attention to the congestion of traffic in the London streets.

The Earl of DENBIGH said that one of the results of the awful congestion in the streets was the harm which was being done by the poisonous atmosphere. There were all sorts of regulations against cars being allowed to emit visible exhaust fumes, but what was the use of such regulations if nothing was done?

Earl HOWE said he did not believe that it was realised how much the air in the London streets was poisoned by exhaust fumes. He believed that the medical profession had carried out tests and they had found that there was an appreciable amount—he had heard quite high figures—of carbon monoxide in the blood of policemen who were employed in directing traffic. He believed that in New York they had attempted to tackle this matter and attempted to ventilate their streets through the drains and the sewers.

The Earl of PLYMOUTH, replying to the debate on behalf of the Government, said he would undertake to bring this matter to the notice of the Minister of Transport and he felt sure he would give it his consideration.

Public Health Services: Minister's Review

On Wednesday, June 20th, the House of Commons went into Committee of Supply on the Civil Estimates, Captain BOURNE, Deputy Chairman of Committees, in the chair.

On a vote of £13,639,924 for the salaries and expenses of the Ministry of Health.

Sir HILTON YOUNG (Minister of Health) said that this year there was an increase of £18,500 in the administrative expenses of the Ministry in connexion with slum clearance and rural water-supplies. There was an increase of £167,000 in respect of housing grants, and in respect of miscellaneous grants there was an increase of £199,000. Between the years 1919 and 1934 the Vote for the Ministry of Health had increased by the enormous figure of £58,000,000. Nearly half of the great increase in the vote had been caused by the De-rating Act. It had nothing to do with social services; it simply represented a change of expenditure from the local to the central pockets of the State.

Last year he dealt with the aspect of national health which was summarised in the word "nutrition," a matter in which it was difficult to give positive proofs. This year he would deal with the standard of national physique and health as shown by the incidence of disease in the country, and the resistance of the population to disease. On this matter it was possible to give very much more positive information, because it was reflected much more in actual figures. The most conclusive figure was the general death-rate, which was very sensitive to the general effects of epidemics and diseases. It took a sharp and marked rise in the influenza year of 1929. The general death-rate of the nation showed an encouraging downward tendency, which was the best proof of general maintenance of national health and physique. In comparison with five years before the standardised death-rate for 1932 stood 10 per cent. lower. That was an improvement in the death-rate after taking account of the fact that the population, owing to the falling death-rate, was annually getting older in its average age. The death-rate was a standardised death-rate which allowed for any increase in the age of the population. The next figure showed a more positive and encouraging result from the nation's great outlay of energy and money on health services, and that was the infant death-rate. During the last ten years, owing to the improvement in the infant death-rate, they had saved 40,000 more infants under one year than was the case at the beginning of the century, and the figures for the ten years at the beginning of the century were a great improvement on those of any preceding such period. This encouraging result was due, as the technicians said, to improvement in environment. The environment of an infant under one year was more than anything else its mother, and the improvement he referred to was, he believed, due basically to the improvement in the education of the mothers in the care of infants.

He offered a word of tribute to the magnificent work done by the 1340 antenatal clinics and the 2820 infant welfare centres. There was nothing which gave a firmer personal conviction of the value of health work than what one saw at these centres. Nor could he pass over the thousands of health visitors and nurses who carried from these centres the good work into the homes of the people. In the last fifteen years they had cut down the death-rate of children under 5 years of age from the three diseases most fatal to children—namely, bronchitis, diarrhœa, and measles—by more than one-half. If they looked not only to children but to adults they saw a good result from the faithful work of the medical profession and the hospitals, and of the administrators in the public health services over the whole field of local and central government. Where one person died of whooping-cough in 1932, nearly four died at the beginning of the century; where one died of diphtheria four died at the beginning of the century; where one died in 1932 of scarlet fever, over seven were dying at the beginning of the century. The most remarkable scientific result of all, attributable to the public health work, was shown by the fact that where one person died in 1932 of typhoid, the number who died at the beginning of the century was 22. The brilliant successes made in this field were shown whenever they came to outside carriers like water or milk, or some bug or insect, or food. The difficulties arose where infection was carried from person to person. It was known to science that there were constantly great waves of infection of these diseases passing through the public which never broke. The microbes were there and grew and declined, but the infection did not break in actual cases of disease. These waves were very difficult to check in order to stop a break of the disease. It followed from that, that since the difficulty of checking these diseases was greatest in cases where it was person to person infection, what they had to work on in order to prevent the diseases was to see that persons were not crowded too closely together. If they put their finger on overcrowding as an evil that clamoured for a national remedy they did so not only in a social sense, but in order to prevent disease. In the ten years up to 1933 the death-rate from tuberculosis had been decreased by 22 per cent. However far the success against tuberculosis was carried, they would never get rid of it until they finally got rid of the slums, which were the refuges of the disease.

The statistics as regards lunacy and mental deficiency might give a less favourable impression. The apparent increase in lunacy was deceptive, because it was a disease of advanced years; and it was probable that the increased average age of the population accounted for the increase of lunacy, rather than any actual increase of the disease. There had been an apparent enormous increase in mental deficiency, but this apparent increase was really due to better ascertainment. During the year there had been a most interesting and unanimous report on the difficult problem of sterilisation, and he was profoundly impressed by the strength of the reasons given by the committee in support of their recommendations as to sterilisation. As far as his own individual conscience was concerned he could see not the least difficulty in approving the recommendations of the Committee. But as regarded ministerial responsibility, they must remember that this was a novel question and one which had not yet been thought out by the mind and heart of the nation. At present, consideration was being given to the report by great organisations of national opinion, such as the churches. It would be wrong for him to propose any national policy in the matter until there had been sufficient time for the national mind and conscience to be cleared.

The maternity death-rate had not decreased like other death-rates during the last 20 years, and that was not satisfactory. They had obtained more knowledge of the question by intensive study, and they knew that the death-rate had not decreased owing to bad local patches in maternity welfare work. He urged the responsible authorities in those localities where the maternity death-rate was above the normal to follow up and intensify inquiries as to the cause of the local variation. There was an increase of 147 more antenatal clinics, and an increasing number of births now took place under the supervision of those clinics. There was also an increase in the number of maternity beds, and he wished to pay special tribute to the success of the London County Council in increasing their maternity service. The work done in connexion with the health services had been very much assisted by the systematic review of those services by the Ministry of Health. Two things were particularly sought in these reviews besides a general increase in efficiency. First they wanted to press forward with the movement inaugurated by the Act of 1929 for taking the treatment of disease out of the poor-law. Good progress had been made in the transfer of institutions dealing with ill-health from the public assistance to the public health committees in London, where 60 institutions had been taken out of the poor-law. Another great advantage was the specialising of institutions.

Referring to the drought, Sir Hilton Young said when the crisis was over they would profit by the experience of the great drought in order to see what could be done to insure against similar emergencies in the future.

The year had been one of tremendous activity in housing, and in particular with the slum clearance campaign. If this rate of acceleration was maintained they would achieve the programme of the White Paper in five years. But they must speed up the rate of demolition still more in order to reach that result. From his knowledge of the progress being made and the vigour which the local authorities were putting into the matter, he could say that unless there was any setback the rate of progress achieved encouraged one to believe that five years would see the programme substantially carried out. At the Ministry the town-planning and the housing work were now in a single department under an officer with the special status of Director of Housing. Forty thousand more houses were built in the half-year ended March 31st than in the preceding half-year, and 77,000 houses were built in the half-year for the lower-paid wage-earners. They were now building houses at the rate of 300,000 houses a year, and at the rate of 155,000 a year for the lower paid wage-earners.

Mr. GEORGE GRIFFITHS urged the Minister of Health to see that diabetic people who had fallen out of medical benefit should continue to get their insulin free, as they had done in the past.

Captain ELLISTON asked what the intentions of the Government were with regard to the British Post-Graduate Hospital and Medical School. He said that before the financial crisis of 1931 £250,000 had been voted for the provision and equipment of this hospital and school. After the crisis that sum was reduced to £100,000, but many leaders of British medicine hoped that now that the financial strain was less acute the Government would take a more liberal view of the possibilities in this connexion. They wanted to see in London a post-graduate medical school which was not only worthy of British medicine, but which would be a central rallying point for medical men from all parts of the Empire and the United States, which sent over hundreds of students every year to graduate in the medical schools of Paris, Vienna, Berlin, and Rome. They left London out because the teaching facilities here were so ill-organised and inadequate. There was in London material which would rival that of any capital in Europe.

The health departments of this country were so fully organised and equipped, and so ably administered, that there was very little more that could be done to increase their efficiency. It only remained to teach the public to make use of those facilities. He appealed to the Minister to advise local authorities that a small expenditure in education would mean a great saving in the cost of public health departments and in preserving the health of the people. It was a great hardship in the local government service that superannuation was in force in only some areas, and he urged that a measure enforcing universal superannuation for local government officers should be undertaken by the Government.

After further debate the further consideration of the Vote was adjourned.

Overhead Tramways and London Hospital

On consideration of the London Passenger Transport Board Bill, as amended by Select Committee, in the House of Commons on Wednesday, June 20th,

Dr. O'DONOVAN moved to leave out Clause 33 of the Bill, which gives power to work Aldgate to Grove-road tramway on the overhead system. He said that this tramway line ran through the biggest thoroughfare of London, having on one side the greatest hospital in London. It would be a pity if this clause should fasten upon the locality of Stepney a transport system which might be well suited to the large dormitory villages across the Lea, but trams should not be encouraged to carry these ancient trolleys up the fine Mile End-road. They would be noisy, and sleep was precious. This great road was already a road of slaughter, and the borough council and the people of the district felt that posts would not add to its safety.

Mr. JANNER said that it was not a light matter to interfere with a hospital such as the London Hospital.

Sir G. HAMILTON said that he knew that overhead equipment could be made practically silent. He was certain that if the London Hospital had any feeling against overhead equipment they would have let the promoters know.

Dr. O'DONOVAN said that he was a physician on the active staff of that hospital and his own patients slept in a ward aligned against the Mile End-road. If Sir G. Hamilton would offer new trams he would withdraw what he had said, but he knew these ancient vehicles.

Sir G. HAMILTON said that they were not dealing with the ancient trams, but with new overhead equipment. That equipment would not cause any noise which would disturb the patients of the London Hospital.

Dr. O'DONOVAN said that he would withdraw his amendment because there were other and constitutional means open to a borough council but not open to a Member of Parliament which could be employed to test the feeling of Parliament on this matter.

The amendment was by leave withdrawn and the Bill was read the third time.

The Milk Bill and Pasteurisation

On June 25th in the House of Commons the Milk Bill was considered on Report.

On Clause 9 (payments for securing pure milk-supply),

Sir S. CRIPPS moved an amendment giving the Minister of Agriculture and the Secretary for Scotland power to exercise the powers conferred on local authorities under the Diseases of Animals Acts, 1894 to 1927, or any orders or regulations made thereunder, in the case of default of any local authority. He said that there were counties where there was very little inspection of dairy herds, while in others it was more systematic. If this power was given it would be very valuable.

Mr. ELLIOT, Minister of Agriculture, said that the confusion that would be caused by saying that the Ministry of Agriculture should carry out a duty which normally belonged to a local authority would be the worst possible thing in the administration of this scheme.

After further debate the amendment was negatived by 209 votes to 49.

Sir A. WILSON moved the following amendment:

For the purposes of this Act the words "pure and free from the infection of any disease" means milk which has: (*a*) not been treated by heat in such a way as to destroy or modify its natural characteristics and to which no foreign matter such as water, skimmed milk, fat, or other substances have been added, and is (*b*) of a standard of bacteriological purity and of nutritional content which shall be fixed from time to time by the Minister of Agriculture and the Minister of Health after a public inquiry at the cost of the Milk Marketing Board.

He said that the amendment proposed first to exclude pasteurised milk or milk treated in other ways from the scope of the Bill and from the scope of milk to receive subsidy from Government funds. The Hopkins Report on which he pinned his faith was exceedingly lukewarm in its references to pasteurisation. It avoided saying that it was beneficial.

Sir FRANCIS FREMANTLE said he thought they were all agreed that they did not want pasteurisation to be used in order to give the people bad or unclean milk in any other way. They all agreed that they would infinitely rather that the children should have pasteurised milk than milk which contained the germs of tuberculosis and other diseases which they knew produced fatal diseases and resulted in the deaths of 2500 children every year. Pasteurisation was only the second best, but it was much better to have a second best than something which was worse. He did not think the amendment was required.

Mr. SKELTON (Under-Secretary of State for Scotland) said that if the amendment was accepted it would go far to prohibit the pasteurisation of milk. There was no intention that any development of pasteurisation should take the place of the cleaning up of the herds so far as this clause was concerned. It might well be that under this Bill it would be worth while to make some investigation into the proper method of pasteurisation. The main method in which the money would be spent, however, would be in the cleaning up of the herds. To make the granting of money for the purpose of cleaning up the herds dependent on the milk reaching a particular standard of bacteriological purity and nutritional content seemed to take them very far away from the vitally important purpose of this clause. He asked that the amendment should not be pressed.

Sir A. WILSON withdrew his amendment.

The Report stage of the Bill was concluded.

HOUSE OF COMMONS

National Health Insurance: Children Leaving School

WEDNESDAY, JUNE 20TH

Captain FULLER asked the Minister of Health if he would consider the desirability of amending the National Health Insurance Act so as to include all persons within its scope who, on leaving school, would enter into insurable employment at 14 under the new Unemployment Bill.—Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health) replied: I would refer my hon. friend to the reply given to a similar question on April 19th last.

Mr. RHYS DAVIES: Is the hon. Member aware that a large number of associations which have considered this problem have recently decided to make representations to the Ministry on the urgency of bringing these children within the national health insurance scheme; and will he look into the matter once again?

Mr. SHAKESPEARE: We shall certainly consider all representations that are made.

Diphtheria Immunisation

Mr. GROVES asked the Minister of Health how many cases of diphtheria and deaths from that disease had occurred in Dewsbury in immunised children since immunisation was first started in that town; and how many months had elapsed since the last inoculation before diphtheria developed in these cases.—Sir HILTON YOUNG replied: According to information furnished by the local authority, the number of cases of diphtheria and deaths therefrom occurring in "immunised" children was in—

	1932.	1933.	1934. Jan. 1st to June 13th
Cases ..	13	26	23
Deaths ..	4	2	3

The following Table shows the length of time which elapsed between the date of last inoculation and the development of the disease:—

Months.	1932.	1933.	1934.	Months.	1932.	1933.	1934.
2 ..	3 ..	— ..	—	13 ..	— ..	1 ..	—
3 ..	3 ..	3 ..	—	14 ..	— ..	2 ..	2
4 ..	2 ..	2 ..	1	15 ..	— ..	3 ..	—
5 ..	3 ..	— ..	1	16 ..	— ..	— ..	1
6 ..	2 ..	1 ..	—	17 ..	— ..	— ..	3
7 ..	— ..	1 ..	—	18 ..	— ..	5 ..	—
8 ..	— ..	3 ..	—	19 ..	— ..	1 ..	1
9 ..	— ..	2 ..	—	20 ..	— ..	1 ..	1
10 ..	— ..	— ..	—	21 ..	— ..	— ..	5
11 ..	— ..	— ..	3		—	—	—
12 ..	— ..	1 ..	5		13	26	23

THURSDAY, JUNE 21ST

Sale of Contraceptives to Poor Persons

Mr. POTTER asked the Minister of Health whether at any of the centres established under his regulations contraceptive appliances were supplied at reduced prices or at the public expense to poor patients.—Sir E. HILTON YOUNG replied: I have not made any regulations on this subject, but have indicated to local authorities the extent to which, as I am advised, they are empowered under the statute law to make arrangements for the giving of contraceptive advice at institutions provided by them. The question of making a charge for any appliances supplied by the local authorities is a matter within their discretion, and I have no complete information on this subject.

Mr. MOLSON: Would it be impossible for the Minister without legislation to relax the conditions which at present apply?

Sir HILTON YOUNG: That would depend upon the proposed relaxations. If the hon. Member has any in mind perhaps he will give me an opportunity of learning his views on the subject.

Appointments

City of London Maternity Hospital: GILBERT, BARTON, M.B., B.S. Lond., Resident Medical Officer; BERGER, B., M.B., B.Ch. Edin., Assistant Resident Medical Officer.

DATNOW, MORRIS, M.D. Liverp., F.R.C.S. Edin., M.C.O.G., Honorary Assistant Gynæcologist to the Royal Southern Hospital, Liverpool.

DUNBAR, J., M.B. Ch.B. Glasg., Surgeon at the Glasgow Royal Infirmary, Lecturer in Clinical Surgery at the Glasgow University and Hon. Consulting Surgeon to the Victoria Infirmary, Helensburgh.

HEARN, R. J., M.D. Camb., assistant deputy corner for Central District of London.

KNOTT, F. A., M.D. Lond., M.R.C.P. Lond., D.P.H., Director of Bacteriological Department and Lecturer in Bacteriology, Guy's Hospital.

London Fever Hospital.—The following appointments are announced: WILLCOX, Sir WILLIAM, M.D., F.R.C.P. Lond., and LAKIN, C. E., M.D., F.R.C.P. Lond., F.R.C.S. Eng., Senior Physicians; HUNT, T. C., D.M. Oxon, M.R.C.P. Lond., and SMITH, K. SHIRLEY, M.D., F.R.C.P. Lond., Assistant Physicians.

MACDONALD, GEORGE, M.B. Edin., D.P.H. Lond., Medical Officer of Health to the Borough of Battersea.

MCGIBBON, J. E. G., M.B. Lond., D.L.O. Eng., Honorary Laryngologist and Aurist to the Royal Southern Hospital, Liverpool.

Manchester Royal Infirmary.—The following appointments are announced: BRYCE, A. GRAHAM, M.D. Manch., F.R.C.S. Eng., Honorary Assistant Surgeon; BOLTON, N. W., M.B. Manch., F.R.C.S. Eng.; HOLT, R. L., M.B. Manch., F.R.C.S. Eng.; SIMMONS, H. T., M.B. Manch., F.R.C.S. Eng.; WATKINS, K. H., M.B. Manch. and Lond., M.S. Lond., F.R.C.S. Eng., Chief Assistants to the Surgical Units.

UNDERWOOD, E. A., M.B. Ch.B. Glasg., D.P.H., Medical Officer of Health, Shoreditch.

WYATT, R. B. H., M.B. Birm., D.P.H., deputy coroner for Central District of London.

MEDICAL NEWS

University of Oxford

On June 21st the degree of D.M. was conferred on H. E. Harding.

University of Cambridge

On June 19th the degree of B.Chir. was conferred on S. J. Hadfield.

Dr. O. A. Trowell, university demonstrator in physiology, has been elected a fellow of St. John's College.

At recent examinations the following candidates were successful :—

THIRD EXAMINATION FOR M.B., B.CHIR.

Part I.: Surgery, Midwifery, and Gynæcology.—A. G. V. Aldridge, T. G. Armstrong, K. C. Bailey, R. H. Bailey, G. Bates, H. H. Bayley, D. A. S. Blair, C. H. T. Bond, J. G. Chappel, L. A. Collins, F. H. Culshaw, F. J. Curtis, R. H. Dale, T. M. Daniel, S. M. Davidson, H. E. Dimsdale, W. H. Ekin, F. I. Evans, J. D. Fergusson, H. A. Hamilton, W. H. C. M. Hamilton, J. W. Hannay, E. E. Harris, G. R. Hawkes, N. G. Hulbert, R. M. Jones, A. M. Lester, F. D. M. Livingstone, E. B. McDowall, K. W. Martin, R. S. Morris, J. H. Moseley, W. S. Nutt, N. C. Oswald, J. R. Owen, A. R. Pope, M. S.-M. Rayner, J. S. Ross, A. G. Salaman, S. K. Sen, D. A. Smith, L. W. Spratt, R. J. Still, F. B. Turner, R. W. D. Turner, P. A. Walford, J. H. Walters, W. H. C. Watson, N. Whittaker, and W. F. Young.

Part II.: Physic, Pathology, and Pharmacology.—R. H. Bailey, A. M. Barrett, C. H. D. Bartley, H. H. Bayley, R. L. Benison, A. T. Blair, T. B. L. Bryan, R. C. F. Catterall, C. M. Cavell, J. R. Chambers A. C. E. Cole, J. Collinson, J. G. Connell, A. H. Dunkerley, J. F. Edwards, C. E. Elliott, W. A. Elliott, F. I. Evans, S. M. Evans, J. D. Fergusson, R. I. N. Greaves, G. D. Hadley, E. A. M. Halsted, L. A. Hawkins, J. D. Hay, G. T. Hindley, N. G. Hulbert, A. Innes, B. S. Jones, R. A. Kellgren, A. M. Lester, R. E. K. Levick, M. W. Lloyd Owen, C. J. Martin, L. C. Martin, M. K. Martyn, H. B. May, W. G. Q. Mills, G. S. W. Organe, B. H. Page, C. G. Pantin, C. G. Parsons, J. P. S. Peck, G. T. Pitts, T. A. Ratcliffe, W. F. Richards, M. A. Rugg-Gunn, S. B. H. Saunders, T. L. H. Shore, M. S. Spink, R. J. Still, D. J. Thompson, A. S. Till, R. W. D. Turner, J. H. Walters, G. L. Ward, M. Williams, H. W. Williamson, V. H. Wilson, and R. M. Yeo.

University of London

At a meeting of the senate on June 20th Prof. L. N. G. Filon, F.R.S., was re-elected vice-chancellor for the year 1934–35. It was resolved that on foundation day, 1934, honorary degrees should be conferred, among others, on Prof. Karl Pearson, F.R.S., and Sir Cooper Perry, M.D.

Three chairs at the new British Postgraduate Medical School were filled by the appointment of Dr. F. R. Fraser as professor of medicine; Dr. James Young as professor of obstetrics and gynæcology; and Dr. E. H. Kettle as professor of pathology. The appointments are dated from October 1st or as soon thereafter as may be practicable.

Dr. Fraser, who is at present university professor of medicine at St. Bartholomew's Hospital, was born in 1885 and educated at Edinburgh Academy and Christ's College, Cambridge, where he obtained first-class in the natural sciences tripos (Part I.). He graduated in medicine at Edinburgh in 1910, and was appointed assistant in medicine at the hospital of the Rockefeller Institute, New York, in 1912, and assistant physician to the Presbyterian Hospital in 1914. After serving in France and at the Hampstead Heart Hospital he became consulting physician to the Rhine Army. In 1920 he was appointed assistant director of the medical professorial unit at St. Bartholomew's Hospital, and later in the same year he succeeded Sir Archibald Garrod as director. In 1925 he re-visited the medical schools in U.S.A. and Canada at the invitation of the Rockefeller Foundation, and in 1927 gave the Goulstonian lectures of the Royal College of Physicians of London, taking as his subject cardiac dyspnœa. In 1928 he lectured in Australia at the invitation of the Melbourne Post-graduate Committee, and in 1933 again visited the United States as Abraham Flexner lecturer at Vanderbilt University. He was a member of the Pharmacopœia Commission till 1933. His principal contributions to medical literature have related to poliomyelitis, heart disease, and exophthalmic goitre.

Dr. Young is obstetric physician to the Edinburgh Royal Maternity Hospital and gynæcologist to the Edinburgh Royal Infirmary. Born in 1883, he was educated at Heriot's School and at the University of Edinburgh, where he graduated M.B. in medicine in 1905. He obtained the fellowship of the Royal College of Surgeons of Edinburgh in 1908, and he has been a fellow of the British College of Obstetricians and Gynæcologists from its foundation. Since 1920 he has been lecturer in clinical obstetrics and gynæcology in the University of Edinburgh. His "Textbook of Gynæcology" is now in its third edition and he collaborated with Munro Kerr, Haig Ferguson, and James Hendry in the "Combined Textbook of Obstetrics and Gynæcology." Dr. Young has devoted his attention specially to maternal mortality, and in collaboration with Prof. Miles Phillips and Dr. W. H. F. Oxley he wrote the section on the maternity services of Holland, Denmark, and Sweden, in the final report of the Departmental Committee on Maternal Mortality and Morbidity. For many years he has carried out investigations into the toxæmias of pregnancy and he has written a book incorporating the results of research on histological changes in the uterus during menstruation and pregnancy. During the war years he served in the Royal Army Medical Corps, and for some time was lieut.-colonel in command of a field ambulance in the 52nd Division. He was awarded the D.S.O.

Dr. Kettle has been university professor of pathology at St. Bartholomew's Hospital for the past six years. Born in 1882 he entered St. Mary's Hospital from Skipton School in 1901, and graduated as M.B. Lond. in 1907. After four years as pathologist to the Cancer Hospital, London, he returned to St. Mary's as first assistant pathologist in 1912. His text-book on "The Pathology of Tumours" first appeared in 1916, from which year, until the end of the war, he was attached as a civil surgeon to the 3rd London General Hospital. In 1920 he became pathologist to St. Mary's Hospital, and in 1924 went to Cardiff as professor of pathology and bacteriology in the University of Wales. While at St. Mary's he began the studies of infection and immunity which have led to the experimental researches on silicosis and other industrial diseases on which he is now especially engaged. His earlier published work is chiefly concerned with cancer and splenomegaly. Prof. Kettle has been examiner in pathology in the Universities of London, Cambridge, and Wales, and is at present examiner at Bristol and Glasgow. He was elected F.R.C.P. Lond. in 1931.

Dr. S. P. Bedson was appointed university professor of bacteriology (Goldsmiths' Company) at London Hospital medical college in succession to Prof. William Bulloch, who retires on Oct. 1st.

Dr. Bedson, who was born in 1886, has been senior Freedom research fellow at the London Hospital for the past eight years. Educated at Abbotsholme School and the University of Durham, he graduated in science in 1907 and in medicine in 1912. After post-graduate training at the Pasteur Institute he worked at the Lister Institute in London as British Medical research fellow in the year before the war. From August, 1914, to March 1916, he held a commission in the Northumberland Fusiliers, and was wounded at Gallipoli. On transference to the Royal Army Medical Corps he was put in charge of bacteriological laboratories, and early in 1919 became assistant advisor in pathology to the Fifth Army. After two years in the bacteriological department of the Durham University College of Medicine he was appointed assistant bacteriologist to the Lister Institute in 1921, and was later seconded for work on foot-and-mouth disease. His research work has been principally on the blood-platelets and purpura and on filtrable viruses.

Dr. A. B. Appleton, fellow of Downing College and university lecturer in anatomy at Cambridge, was appointed to the university chair of anatomy at St. Thomas's Hospital, in succession to Prof. W. E. Le Gros Clark, as from Sept. 1st.

Dr. Appleton entered Downing College in 1907, and in the following year was elected a foundation scholar. He gained an entrance scholarship at St. Bartholomew's Hospital in 1911, having taken first classes in both parts of the natural sciences tripos. On qualifying in 1914 he was appointed a demonstrator of anatomy in Cambridge, but in October of that year went to France on active service with a commission in the Royal Army Medical Corps. After serving in Malta, Macedonia, and again in France, he resigned his commission in 1919 and was appointed senior demonstrator of anatomy at Cambridge; he was appointed lecturer in 1926. He was awarded the Raymond Horton-Smith Prize for his M.D. thesis in 1922 and the Symington prize of the Anatomical Society in 1923. His research work has been chiefly on the muscular system and the development and growth of bone.

The title of emeritus professor of bacteriology was conferred on Dr. William Bulloch, F.R.S., on his retirement from the Goldsmiths' Company's chair of bacteriology at the London Hospital, and that of emeritus professor of ethnology on Dr. C. G. Seligman, F.R.S., on his retirement from the university chair of ethnology at the London School of Economics.

The date of the appointment of Prof. Karl Pearson as Heath Clark lecturer was changed from 1934 to 1935, and Dr. L. W. Hackett, assistant director of the international health division of the Rockefeller Foundation, was appointed for the year 1934.

Society of Apothecaries of London

At recent examinations the following candidates were successful :—

Surgery.—R. M. Outfin, Guy's Hosp. and Univ. of Bristol.

Medicine.—G. A. Bell, Guy's Hosp.; G. W. Bender, St. Mary's Hosp.; P. E. Cresswell, Univ. of Oxford and Guy's Hosp.; C. McK. Johnston, King's Coll. Hosp.; S. Klein, Univ. of Vienna and St. Mary's Hosp.; and A. Lassman, Univ. of Manch.

Forensic Medicine.—G. W. Bender, St. Mary's Hosp.; P. E. Cresswell, Univ. of Oxford and Guy's Hosp.; C. McK. Johnston, King's Coll. Hosp.; and S. Kay, Univ. of Toronto.

Midwifery.—W. C. Campbell, Univ. of Birm.; W. McC. Graves Morris, Guy's Hosp.; H. W. John, St. Mary's Hosp.; S. Kay, Univ. of Toronto; and G. F. Metcalf, Univ. of Leeds.

Having completed the final examination, S. Kay and G. F. Metcalf have been granted the diploma of the society entitling them to practise medicine, surgery, and midwifery.

University of Leeds

Mr. E. R. Flint has been elected to the chair of clinical surgery in the university.

Mr. Flint qualified in 1905 and graduated at Leeds University in the following year, proceeding to the Fellowship of the Royal College of Surgeons of England in 1912. He held resident appointments at the Leeds General Infirmary and elsewhere, and before joining the honorary staff was surgical tutor at the Infirmary. He delivered Arris and Gale lectures before the Royal College of Surgeons of England in 1923 and 1930—his subjects being abnormalities of the hepatic and cystic arteries and bile-ducts and the association between gall-bladder lesions and hepatitis—and a Hunterian lecture on preoperative procedure appeared in our columns last year. Mr. Flint is surgeon to the General Infirmary at Leeds and for some years has acted as honorary demonstrator of physiology at the Leeds School of Medicine. On his new appointment he will retain his position as director of surgical research.

University of Glasgow

On June 20th the honorary degree of LL.D. was conferred on Prof. René Leriche of the faculty of medicine of Lyons. The following ordinary degrees were also conferred:—

D.Sc.—William James Hamilton, M.B., and Thomas Nicol, M.B.

M.D. (*with honours*).—D. Baird and J. M. Johnston; (*with commendation*).—Margaret E. R. Loudon, W. Bain, W. Blyth, J. B. L. McKendrick, and Elizabeth M. Pollock.

Ch.M. (*with high commendation*).—A. M. Clark.

The history of medicine prize has been awarded to Dr. W. J. Rutherford.

Dr. Archibald Harrington has been appointed to the Muirhead chair of medicine in succession to Prof. W. K. Hunter, who is to retire on September 30th.

Dr. Harrington graduated in medicine at the University of Glasgow in 1900 and became M.D. in 1903. After holding numerous junior appointments at general and special hospitals in Glasgow, he was appointed assistant physician, and later physician, to the Glasgow Fever Hospital, Ruchill. He also served on the honorary staff of the Bellahouston Hospital. Elected F.R.F.P.S. in 1912, he is at present visiting physician to the Royal Infirmary and lecturer and examiner in clinical medicine in the university. His published work deals with a large variety of medical problems.

Epsom College

Lord Leverhulme, the new president, took the chair at the 81st annual general meeting of the governors of the college, which was held at the office, 49, Bedford-square, W.C.1, on June 22nd. In presenting the council's annual report he emphasised the importance of the appeal for new governors in order to enlarge the activities of the foundation. He pointed out that possibly no profession felt the effects of a period of depression more acutely than the medical profession, whose voluntary work in such times was as much increased as their private practice was diminished. It was all the more necessary, therefore, to help as many as possible of the large and ever-growing number of applicants for pensionerships and foundation scholarships. This year the list of successful foundationers contains the names of boys whose fathers practised in Glasgow, Stepney, Shropshire, Peterborough, London, Sierra Leone, and the military and naval medical services. A list of the successful candidates appeared in our last issue.

Medical Reunion in Vienna

The dates of this reunion, which was announced in our issue of June 9th (p. 1264), have been changed, and it will now be held from July 29th to August 4th.

Fellowship of Medicine and Post-Graduate Medical Association

Dr. Clark-Kennedy will give a lecture-demonstration on High Blood Pressure at the rooms of the Medical Society of London, Chandos-street, Cavendish-square, on Tuesday, July 10th, at 2.30 p.m. A week-end course in general medicine and surgery will be given at the General Hospital, Southend-on-Sea, on Saturday and Sunday, July 7th and 8th. There will be a course in dermatology at the Blackfriars Skin Hospital from July 9th to 21st, and a course in urology at the All Saints' Hospital from July 9th to 28th. Dr. Peter Kerley will give three X ray demonstrations for M.R.C.P. candidates at the rooms of the Medical Society of London at 8.30 p.m. on Monday, July 2nd, Wednesday, July 4th and Friday, July 6th. On Saturday, July 14th, Dr. W. J. O'Donovan will give a demonstration of dermatological cases at 3 p.m. at the National Temperance Hospital. Further particulars may be had from the secretary of the Fellowship, Wimpole-street, London, W.1.

Royal Medico-Psychological Association

The ninety-third annual meeting of this association will be held from July 4th to 6th at the Guildhall, Northampton, under the presidency of Dr. D. F. Rambaut, superintendent of St. Andrew's Hospital, Northampton, who will deliver a presidential address entitled Some Mental Treatments. Other speakers will include Mrs. Eleanor C. Slagle, director of occupational therapy in the New York State department of mental hygiene (occupational therapy); Dr. Henry Yellowlees (modern psychiatry and mental hospitals); Dr. Rolf Ström-Olsen (results of treatment by prolonged narcosis); and Dr. D. C. L. Paddle (lumbar puncture and the cerebro-spinal fluid in 2000 mental defective cases). The secretary of the association is Dr. R. Worth, Springfield Mental Hospital, near Tooting, London, S.W.17.

Training of Nurses: Committee of Inquiry in Scotland

The Secretary of State for Scotland has appointed a committee "to enquire into the training and system of registration of nurses in Scotland and to recommend what amendments, if any, should be made in the Nurses Registration (Scotland) Act, 1919, or the rules made thereunder, and what other steps, if any, should be taken to improve the existing system of training and registration." The members of the committee are: Sheriff A. Campbell Black, K.C. (chairman); Dr. W. L. Burgess, medical officer of health, Dundee; The Lady Susan Gilmour Queen's Institute of District Nursing; Dr. Mary R. Knight, medical superintendent, Paisley District Asylum; Mr. T. B. M. Lamb, Scottish Education Department; Sir Henry Mechan, Western Infirmary, Glasgow; Dr. John Reid, medical superintendent, County Hospital, Motherwell; Miss Elizabeth D. Smaill, matron, Edinburgh Royal Infirmary; Miss Christina Whyte, matron, Robroyston Hospital, Glasgow; and Dr. John Young, Falkirk and District Royal Infirmary. The secretary of the committee is Mr. W. T. Mercer, of the Department of Health for Scotland, 121a, Princes-street, Edinburgh, to whom all communications should be addressed.

Silicosis and Asbestosis

The Home Secretary has given notice that he proposes to amend paragraph 12 of the Silicosis and Asbestosis (Medical Arrangements) Scheme, 1931, which provides for the initial medical examination of workmen newly engaged for employment in certain occupations. Copies of the draft amending scheme may be had on application to the Industrial Division, Home Office, Whitehall, London, S.W.1.

Oxford Ophthalmological Congress

This congress meets at Keble College, Oxford, on the evening of next Wednesday, July 4th, and on the following morning after a welcome by the Master, Mr. Cyril Walker, there will be a symposium on functional diseases of the eye, the speakers including Sir Farquhar Buzzard, Mr. F. Williamson-Noble, and Dr. William Brown. Mr. R. Affleck Greeves will report a case of retinal glioma treated by radium externally. In the afternoon Dr. H. W. Barber is to give an address on the ætiology and treatment of some conditions affecting the eyelids, and there will be a number of demonstrations; in the evening the annual dinner will be held in Keble College. On the morning of Friday Dr. Thomson Henderson will speak on the constitutional factor in myopia, and Mr. Arnold Sorsby on the pre-myopic state, and Prof. Joseph Meller, of Vienna, will deliver the Doyne memorial lecture on tuberculosis and its relation to spontaneous post-traumatic and sympathetic ophthalmia. Communications in the afternoon include papers on the influence of diet in ophthalmic practice (Dr. Oliver Pratt), thermoplasty of the extra-ocular muscles (Mr. Bernard Chavasse), and the ætiology and treatment of congestive glaucoma (Mr. J. Jameson Evans and Mr. P. Jameson Evans). On Saturday morning Mr. F. Ridley will speak on the clinical significance of the composition of the tears, and Mr. L. H. Savin on uveoparotid fever. The address of the hon. secretary, Mr. C. G. Russ Wood, is Hill House, Abberbury-road, Iffley, Oxford.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, July 3rd.
Annual General Meeting of the Society. 5 P.M.
FRIDAY.
Obstetrics and Gynæcology. 8.15 P.M. Discussion in conjunction with the Medico-Legal Society on Sex: Its Nature and Abnormalities Considered from Biological and Legal Points of View. To be opened by Prof. F. A. E. Crew, Dr. H. Gardiner-Hill, Sir Bernard Spilsbury, and Lord Riddell. Members of the Section of Medicine are specially invited.

MEDICO-LEGAL SOCIETY.
See under ROYAL SOCIETY OF MEDICINE.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.
WEDNESDAY, July 4th.—Visit to the Heritage Schools, Chailey, Sussex. Mrs. C. W. Kimmins.

OXFORD OPHTHALMOLOGICAL CONGRESS.
THURSDAY, July 5th, to SATURDAY.—Annual Meeting at Oxford.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.
WEDNESDAY, July 4th, to FRIDAY.—Annual Meeting at Northampton.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, July 2nd, to SUNDAY, July 8th.—PRINCE OF WALES'S HOSPITAL, Tottenham, N. All-day Course in Medicine, Surgery, and the Specialties.—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W. All-day Course in Cardiology (open to non-members).—CHILDREN'S CLINIC, Cosway-street, Marylebone-road, N.W. Course in Children's Diseases.—GENERAL HOSPITAL, SOUTHEND-ON-SEA. Week-end Course in Medicine and Surgery. All day, Sat. and Sund.—MEDICAL SOCIETY OF LONDON, Chandos-street, W. Demonstrations of X Rays by Dr. Peter Kerley, at 8.30 P.M. on Mond., Wed., and Frid. (Specially suitable for M.R.C.P. candidates.)—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily.—Courses of instruction, clinics, &c., arranged by the Fellowship of Medicine are open only to Members and Associates unless otherwise stated.

UNIVERSITY OF BIRMINGHAM.
TUESDAY, July 3rd.—3.30 to 5 P.M. (at the Children's Hospital), Dr. J. M. Smellie: Pulmonary Fibrosis and Allied States.
FRIDAY.—3.30 to 5 P.M. (at the Queen's Hospital), Mr. R. K. Debenham: Minor Operative Procedures.

Vacancies

For further information refer to the advertisement columns

Aberdeen, P.H. Dept.—Asst. M.O.H. £600.
Aberdeen University.—Lecturer in Morbid Anatomy. £400.
Accrington Victoria Hospital.—H.S. £150.
Ayr County Hospital.—Res. H.S. At rate of £125.
Bangor, Caernarvonshire and Anglesey Infirmary.—Jun. H.S. At rate of £100.
Bath, Royal United Hospital.—H.S. and Out-patient and Cas. O. Each at rate of £150.
Birkenhead C.B.—Res. Asst. M.O. £350.
Birmingham and Midland Eye Hospital.—Third H.S. At rate of £100.
Cambridge, Addenbrooke's Hospital.—H.S. At rate of £130.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency Officer. At rate of £130.
Chester, Barrowmore Hall, Great Barrow.—H.P. At rate of £100.
Chesterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.
Colchester, Essex County Hospital.—H.P. £150.
Connaught Hospital, Walthamstow, E.—H.S. At rate of £100.
Dagenham Urban District Council.—M.O.H. £900.
Devizes, Wilts County Mental Hospital.—Med. Supt. £900.
Durham County Hospital.—Two H.S.'s. Each £150.
East Ham Memorial Hospital, Shrewsbury-road, E.—Hon. Ophth. Surgeon.
East Ham and Southend-on-Sea Mental Hospital.—Med. Supt. £900.
Edinburgh Corporation, Venereal Diseases Scheme.—Clin. M.O. £750.
Folkestone Royal Victoria Hospital.—Sen. and Jun. Res. M.O.'s. At rate of £150 and £120 respectively.
Gloucester, Gloucestershire Royal Infirmary, &c.—H.P. and H.S. Each at rate of £150.
Grimsby and District Hospital.—Sen. and Jun. H.S.'s. £200 and £150 respectively.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Hampshire County Council.—Asst. County M.O. £600.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. At rate of £50.
Hospital Français, 172, Shaftesbury-avenue, W.C.—Physician to In-patients. Also Otolaryngologist for Out-patient Dept.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W. Res. H.P. At rate of £100.
Hospital for Sick Children, Great Ormond-street, W.C.—Three Out-patient Surgical Registrarships. Each £200.
Huddersfield Royal Infirmary.—2 H.S.'s. Each at rate of £150.
Hull Royal Infirmary.—Cas. O. At rate of £150.
Hull Royal Infirmary.—Third H.S. At rate of £150.
Indian Medical Service.—Commissions.
King Edward Memorial Hospital, Ealing.—Jun. Res. M.O. At rate of £150.
Leamington Spa, Warneford General Hospital.—Res. H.S. to Cas. and Special Depts. At rate of £150.
Leicester, Leicestershire and Rutland Mental Hospital, Narborough. Sen. Asst. M.O. £550.
Lincoln County Hospital.—Jun. H.S. At rate of £150.
Llanelly and District Hospital.—H.S. £150.
London Hospital, E.—Hon. Asst. Anæsthetist.
London Homœopathic Hospital, Great Ormond-street, W.C.—Res. M.O. £100.
London Lock Hospital, 91, Dean-street, W.—Surg. Reg. £100.
Manchester, Ancoats Hospital.—H.S. to Special Depts. At rate of £100.
Manchester, Booth Hall Hospital for Children.—Dept. Med. Supt. £550. Res. Surg. O. Also Jun. Asst. M.O.
Manchester, Christie Hospital and Holt Radium Institute.—Radiological Asst. M.O. £450.
Manchester, Crumpsall Hospital &c.—Deputy Med. Supt. £600. Res. Surg. O. £400. Res. Obstet. O. At rate of £300. Also Two Jun. Asst. M.O.'s. Each at rate of £200.
Manchester Royal Children's Hospital.—Res. M.O. At rate of £125.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Manchester, St. Mary's Hospital.—Three H.S.'s to Special Depts. Each at rate of £50.
Manchester, Withington Hospital, &c.—Deputy Med. Supt. £600. Res. Surg. O. £400. Also Three Jun. Asst. M.O.'s. Each at rate of £200.
Mansfield, Harlow Wood Orthopædic Hospital.—Two H.S.'s. Each at rate of £175.
Margaret-street Hospital for Consumption and Diseases of the Chest, W.—Hon. Asst. Phys. and Hon. Asst. Radiologist.
Middlesex C.C.—Dist. M.O.'s and Public Vaccinators. £50 and £100.
Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Asst. Cas. O. Also Jun. Res. M.O. At rate of £125 and £100 respectively.
Miller General Hospital, Greenwich-road, S.E.—Cas. O. At rate of £150.
National Temperance Hospital, Hampstead, N.W.—Hon. Asst. Surgeon.
Newcastle-upon-Tyne, Hospital for Sick Children.—H.P. and H.S. At rate of £100.
Newcastle-upon-Tyne Hospital for Sick Children.—Res. Surg. O. £250.
New Zealand, Wellington Hospital Board.—Res. Surg. O. £400.
Northampton General Hospital.—H.S. to Ear, Nose and Throat Dept. At rate of £150.
Plymouth, S. Devon and E. Cornwall Hospital.—Res. Anæsthetist and H.S. to Spec. Depts. At rate of £120.
Prince of Wales's General Hospital, W.—Hon. Physician to Children's Dept.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—Dermatologist.
Reading, Royal Berkshire Hospital.—Res. Anæsthetist. £150.
Royal National Orthopædic Hospital, 234, Gt. Portland-street, W.—H.S. for Brockley Hill, Stanmore. At rate of £150.
St. Bartholomew's Hospital, E.C.—Chief Asst. to X Ray Diagnostic Dept.
St. John's Hospital, Lewisham, S.E.—H.P. and Cas. O. Each at rate of £100.
Salisbury General Infirmary.—H.S. and H.P. Cas. O. Each at rate of £125.
Scarborough Hospital and Dispensary.—H.S. At rate of £175.
Sheffield Children's Hospital.—H.S. Also H.P. Each at rate of £100.
Sheffield Royal Infirmary.—M.O. to Assist Medical Director at Sheffield Radium Centre.
Sheffield Royal Infirmary.—Ophth. H.S. At rate of £80–£100.
Shoreham-by-Sea, Southlands Hospital.—Asst. M.O. Temporary Asst. M.O. £350.
Southampton, Royal South Hants and Southampton Hospital.—Cas. O. At rate of £150.
Southend-on-Sea General Hospital.—H.S. At rate of £100.
Southern Rhodesia Medical Service.—Government M.O. £600.
Stockport Infirmary.—H.S. £150.
Taunton and Somerset Hospital.—H.P. At rate of £100.
Weir Hospital, Grove-road, Balham, S.W.—Jun. Res. M.O. £150.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Hon. Asst. Surgeon.
Willesden General Hospital, Harlesden-road, N.W.—Hon. Phys. to Skin Dept.
Witham, Essex, Royal Eastern Counties Institution.—Med. Supt. £600.
Wolverhampton Royal Hospital.—H.P. At rate of £125. Also Asst. Res. M.O. and H.S. to Spec. Depts. Each at rate of £100.
Worcester Royal Infirmary.—H.P. £160.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Liverpool, Garston, Lancs.; and at Mullion, Cornwall.

NEW WING OF KING GEORGE HOSPITAL, ILFORD. On Saturday last the foundation-stone of a new wing was laid by Mr. Henry T. Becker, who has given £25,000 towards the cost. The wing will accommodate 58 patients.

NOTES, COMMENTS, AND ABSTRACTS

JOINT LUBRICATION

By Eric Shirley Jones, M.R.C.S. Eng.

An animal joint and a machine bearing have this in common: each consists of two accurately opposed solid surfaces separated by a film of fluid lubricant. The importance which the engineer attributes to this film is well known. He recognises two separate states of lubrication [1]:

(*a*) *Fluid film or "perfect" lubrication*, in which a film of liquid lubricant one or two thousandths of an inch thick separates the solid surfaces. In this state friction is independent of load, and is only dependent on the viscosity, or resistance to shear, of the oil film. This is the state of lubrication aimed at by all machine designers, and is the state which almost certainly obtains in a healthy joint working under favourable circumstances.

(*b*) *Boundary layer lubrication*.—The molecules of oil in contact with a metal surface become "adsorbed" to the metal and act, no longer as a liquid, but as a greasy solid. The state of affairs when two such layers are in contact is called "boundary layer" lubrication. In this state friction is proportional to load, and follows the ordinary laws governing solid friction. The viscosity (resistance to change of shape) of the oil no longer counts, but another property called "oiliness" becomes the dominant factor in friction reduction.

The engineer recognises this state as an unavoidable evil, which will occur under conditions of heavy load, low speed, or at stopping and starting. It is probable that this state also occurs in joints. The cracking of joints on being moved after rest is difficult to explain unless we assume an absence of the fluid film.

The essential characteristics for a fluid lubricant appear to be three:

1. It must wet the surfaces to be lubricated.
2. It must possess viscosity to prevent its being squeezed out under load.
3. It must possess "oiliness" to prevent friction when boundary layer conditions occur.

Synovial fluid obviously satisfies the first condition. In the following results (Table I.) viscosity has been measured by the Hess viscometer. This instrument consists of two parallel capillaries, along which water and the fluid to be measured are simultaneously aspirated. The result is expressed in times the viscosity of water. Forkner [2] has found viscosities of synovial fluid to range from 2·91 to 4·79 in health; and from 2·7 to 16·7 in chronic arthritis. Pemberton [3] agrees with these figures, and some of the appended results are in fair agreement. Kling [4] has shown that the viscosity of synovial fluid is due to its mucin, and that, when this is removed, the viscosity drops to that of a simple exudate.

My attempts to measure "oiliness" of synovial fluid under "boundary layer" conditions have so far failed, although surfaces of glass, ebonite, wood, cast iron, rubber, and articular cartilage have all been tried.

THE COEFFICIENT OF STATIC FRICTION FOR TWO PLANE SURFACES

When the small weight (w) is just large enough to cause the large weight (W) to move, the coefficient of static friction $\mu = w/W$. (Fig. 1.) This fraction is

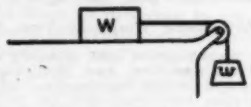

FIG. 1.—Measurement of coefficient of friction for two plane surfaces.

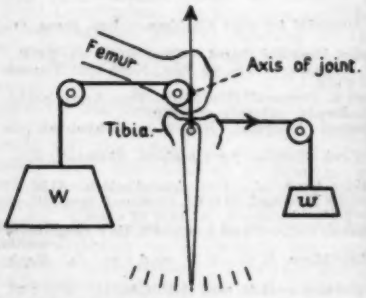

FIG. 2.—Measurement of coefficient of friction of a joint.

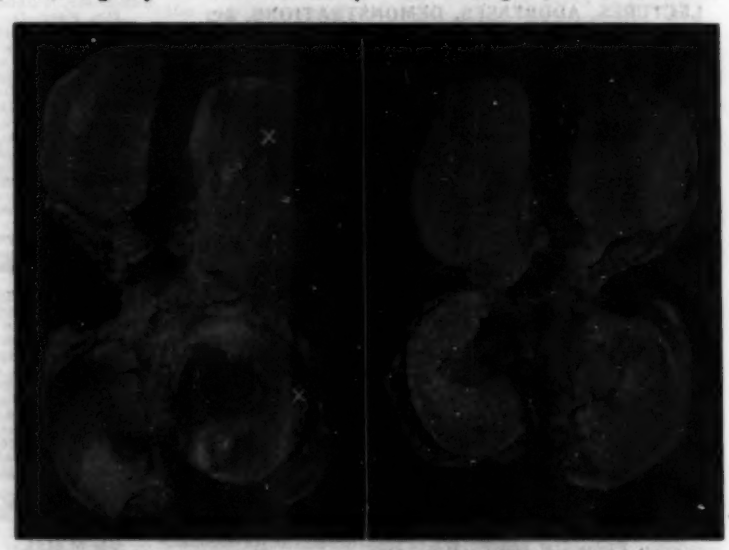

FIG. 3.—Test joint (left of Figure) and control joint (right). The test joint shows signs of wear over the areas marked x.

independent of the load W, and depends only on the character of the surfaces.

Since a joint has curved surfaces it is essential that the resultant of the load (W) shall pass through the axis of the joint. Otherwise the load will cause movement and vitiate the result. To satisfy these conditions, a horse's stifle joint was set up in a frame so that the femur was fixed and the tibia free to move. (Fig. 2.) Through the tibia was passed a steel pin, and cords from this were passed over pulleys to the loads (W). These pulleys were on an adjustable carriage, and this was adjusted until the tibia would remain in any position through a small arc, showing that the resultant of the weights (W) passed through the axis of the joint. Capsule and ligaments were severed, and the measurement was taken working downward, to prevent a sticking tendency that otherwise developed.

	w/W = μ (coefficient of friction).
With synovial fluid ..	$\frac{10}{448}$ ounces = 0·02.
With normal saline ..	$\frac{9}{448}$,, = 0·02.
Surfaces allowed to dry	$\frac{122}{448}$,, = 0·27.

TABLE I.—RESULTS OF VISCOSITY MEASURED BY THE HESS VISCOMETER

Specimen.	Joint.	Animal.	Age.	Quantity. c.cm.	Colour.	Precipitate.	Reaction.	Sp. gr.	Viscosity.	Cartilage.	Synovia.
1	Stifle (knee).	Horse.	12	9	Medium straw.	Nil.	Alk.	—	2·5	Pitted and lipped (slight).	Normal.
2	Stifle.	"	?	4	Dark straw (cloudy).	"	Neutral.	—	5·6	Marked erosion.	Dark red.
3	"	Cow.	?	11	Light straw.	Floc.	Alk.	—	4·4	Slight erosion; no lipping.	—
4	"	Horse.	?	14	"	Nil.	"	—	4·2	Slight erosion; slight lipping.	—
5	"	"	12	4	"	"	"	—	5·0	Marked erosion of one condyle.	—
6	"	"	Under 10	7	"	"	Neutral.	1010	5·8	Pitting (healing).	Injected.
7	"	"	8	8	Medium straw.	"	"	1020	7·0	" "	"
8	Hip.	"	?	17	"	Floc.	Alk.	1015	3·8	Slight pitting and lipping.	—
9	Stifle.	"	?	23	Medium straw (cloudy).	Nil.	"	1010	5·0	Small erosion; ? healing.	—
10	Carpus.	"	?	12	Light straw.	"	"	—	3·0	Very shallow pitting.	—
11	Stifle.	"	8	27	"	"	"	1020	10·0	Erosion present.	Red.
12	"	"	"Old."	8	"	"	"	—	4·6	Erosion marked.	—
13	"	"	"	6	"	"	"	—	5·0	Lipping present.	—
14	"	Pony.	5	9	Medium straw.	"	"	1015	6·0	Healthy.	Healthy.
15	"	Horse.	17	6	"	"	"	1015	6·1	Erosion (healing); pitting.	Red.
16	Carpus.	"	17	3	"	"	"	—	5·1	Very slight pitting.	Healthy.
17	Stifle.	"	17	7	"	"	"	1015	6·8	Erosion (healing).	Slightly reddened.

Floc. = flocculent Alk. = alkaline.

In examining the above it should be remembered that horses are usually destroyed before any advanced degree of arthritis has occurred.

BEHAVIOUR OF AN UNLUBRICATED JOINT WHEN WORKED UNDER LOAD

Two horse stifle joints were worked through an arc of 50° 110 times a minute. The surfaces of each were pressed together by a load of 1 cwt. (Table II.)

TABLE II

Time run.		Control joint.	Test joint.
Hours.	Min.	Capsule intact and enveloped in jaconet to prevent drying.	Capsule dissected off. Joint washed through with normal saline and allowed to dry.
1	15	—	Creaking audible.
2	20	—	Crepitus palpable.
4	0	—	Joint heated. Steam rising. Debris thrown out. Bone grating.
4	46	—	Test stopped.

RESULT

—	Control joint.	Test joint.
Femur.	Surfaces undamaged.	Internal condyle worn down to bone. External condyle undamaged.
Tibia.	Surfaces undamaged.	Marked wear on internal semilunar cartilage. External cartilage and condyle undamaged.

There is little doubt that the external condyles of the test joint would have worn as did the internal ones. The test was, however, stopped, owing to fear of a break-up.

CONCLUSIONS

1. The quantity, specific gravity, and viscosity of synovial fluid are variable.

2. The coefficient of friction of a joint that has dried is nearly fourteen times as high as when lubricated by synovial fluid or normal saline.

3. A joint whose surfaces are unlubricated is quickly destroyed when worked under light load.

4. It is illogical to admit our ignorance of the causes of arthritic change until the lubrication problems involved have been fully worked out.

My thanks for assistance, advice, and material are due to Dr. W. Russell Carling, Mr. E. C. Ulrich, Messrs. the Vacuum Oil Company, Ltd., and Messrs. Bartrams.

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A DISCLAIMER.—Mr. John R. Baker, D.Phil., writes from the Department of Zoology and Comparative Anatomy, University Museum, Oxford: "I have discovered that packets of a certain German chemical contraceptive sold in this country contain a printed slip giving (inaccurately) extracts from a paper by myself. I wish to be allowed to state that I have never given permission for these extracts to be distributed in this way."

THE CHLORINATION OF WATER-SUPPLIES

THE evolution of modern methods of purification of water-supplies by chlorination, with the remarkable achievements of the last four decades, was described by Colonel P. S. Lelean, F.R.C.S., at the annual meeting of the British Waterworks Association on June 27th. The earliest record of chlorination of bulk water-supplies, he said, dates only from 1900, and in 1916 systematic chlorination of London's huge water-supply was adopted at the instigation of the late Sir Alexander Houston. From the military standpoint, two interesting suggestions had been made in 1903 to enable troops to treat the contents of their individual water bottles by halogens. Schumberg proposed to supply small glass capsules of bromine, and Nesfield suggested liberation of iodine by reaction between two tablets (iodide and organic acid)—the halogen in either case to be naturalised, after half an hour's contact, by adding a tablet of "hypo" to the water-bottle contents. Later, Nesfield suggested the further possibility of chlorination of bulk water in the field by liquid chlorine.

Vehicle and Application of Chlorine

Vehicles for chlorine now disused were of bleach and liquid chlorine, but chloramine had proved to have the following advantages over chlorine:—

1. Not being wasted, less is required for immediate germicidal action and the residue is available for checking contamination, aftergrowths, and algal formation.
2. The process causes neither taste nor odour, and hence contact can be prolonged with resultant greater safety.
3. Chloramine being thermostable below 80° its free chlorine is less liable to be evolved from hot-water house-warming systems.

The Action of Chlorine

Theories on the action of chlorine in water purification were numerous and varied. Chemists, mathematicians, toxicologists, physicists, and bio-chemists had all contributed their share and the problem was not even yet solved. In practice, however, despite the wide diversity of opinion regarding rival means of water purification and the details of their application, certain general principles were now being widely accepted. Colonel Lelean quoted here Race's dictum: "Chlorination is an invaluable adjunct to other means of water purification, but the principle of using chlorination as the first and last line of defence cannot be recommended. Success can only be obtained by eternal vigilance, and the responsibility for results is more than the water-works officials should be called upon to assume." There was a tendency to regard chlorination as so reliable a defence that correlated filtration need be assigned merely the duty of clarification. Consequently, chlorination prior to filtration was being used to effect considerable economy by inhibiting the algal growth of zoögloea upon which the antibacterial efficiency of sand filters as the second line depends. Recently the London practice has been to chlorinate after, instead of before, filtration; while the consequent economy in chlorine might not quite balance the extra cost of washing the filters, the increased strength of the second line of defence was nevertheless perhaps good value.

Addition of sufficient ammonia to water prior to chlorination wholly prevented the development of unpleasant tastes. That was perhaps the strongest possible argument in the armoury of those who urged the adoption of chloramination instead of chlorination of water-supplies. While ammonia was a taste-preventer, permanganate was both a taste-preventer and a taste-remover—whether added before, during, or after chlorination. But ammonia was cheaper than permanganate at the requisite dilutions and two million Londoners had been supplied with chloraminated Thames water without a single complaint on account of objectionable taste.

Tests

Various tests for the presence of free chlorine in water had been devised. The earliest was the starch-potassium iodide reaction. This test suffered from several disadvantages especially when employed for quantitative measurement.

Attempts had been made to overcome some of these difficulties by replacing the starch by a compound of more definite constitution and properties. For this purpose α-naphtha-flavone had been suggested and this compound, which was first investigated in this respect by Barger and Fields, gives a colour with iodine concentrations so dilute as 1 part per million parts of water.

A reagent very much in use at the present time was O-tolidine in 10 per cent. HCl. A suitable quantity of this reagent is added to 20–50 c.c.m. of water. A yellow or brown colour is developed, the intensity depending on the amount of free chlorine present. This colour is compared with a series of permanent standards either directly or in some form of comparator, and in this way free chlorine in water was quantitatively estimated.

The reaction involved here was essentially chemical and very sensitive, but the shades of yellow and brown produced were not very characteristic and it was not always easy—especially for the untrained observer—to reach an even approximately correct result. In view of these difficulties a new test had within the last month been developed by British Drug Houses, Ltd.

In a suitable tube are placed 5 c.c.m. of a special reagent called "B.D.H. Chlorotex," to which 50 c.c.m. of the water to be examined are then added. With increasing concentrations of chlorine the shade of the colour reaction changes from an orange-red through purple to blue and then through various shades of blue to green. The orange-red appears at about 0·2 part per million and deepens to deep red at 0·5. There is a sharp change to purple at 0·6 part; violet at 0·8 part; and blue at 1·0 parts per million. The reagent is stable and can be kept to be used as required. The test is very simple to carry out and a serious mistake is much less likely than when a judgment has to be made of the depth of colour.

This test, said Colonel Lelean, seems to constitute a distinct advance on the quantitative methods so far employed in respect both of ease of application and reading and as regards reliability.

Births, Marriages, and Deaths

BIRTHS

BLACKBURN.—On June 24th, at Devonshire-place, the wife of Norman Blackburn, M.B., Fairport, Muswell Hill, of a son.

CLAYE.—On June 24th, to Marjorie Elaine, M.B., M.R.C.S., the wife of Andrew Moynihan Claye, M.D., F.R.C.S., of North Grange Mount, Leeds, 6—a daughter.

CUDDIGAN.—On June 8th, the wife of Dr. James Cuddigan, of New Ollerton, Notts, of a daughter.

SACHS.—On June 23rd, at Navarino Mansions, E.8, the wife of Dr. I. J. Sachs, of a daughter.

SMYTH.—On June 18th, 1934, to Esther, wife of Michael Smyth, F.R.C.S., at Wimpole-street—a daughter.

MARRIAGES

CRAWFORD—WARREN.—On June 9th, at St. Luke's Church, Royal Naval Hospital, Chatham, Thomas George Brown Crawford, Surgeon Lieut.-Commander, R.N., to Eleanor Mary, elder daughter of Surgeon-Captain and Mrs. Warren, R.N. Hospital, Chatham.

MCMENEMY—INKSTER.—On June 16th, at King's College Chapel, Aberdeen, William Henry McMenemy, D.M., M.R.C.P., to Ruby, youngest daughter of the late James Inkster, Aberdeen.

DEATHS

BRUNWIN.—On June 21st, in London, Alan Deed Brunwin, M.A., M.D., of Slyne Lodge, Lancaster.

MORRISON.—On June 14th, at his residence, Place Mohammed Ali, Alexandria, Egypt, Arthur Andrew Morrison, C.M.G., M.D., aged 76 years.

VALENTINE.—On June 23rd, at Rock House, Appledore, William Arthur Valentine, M.D. Dubl., T.D., Major, R.A.M.C., T.A., retd., aged 65 years.

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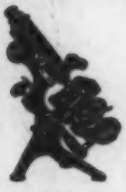

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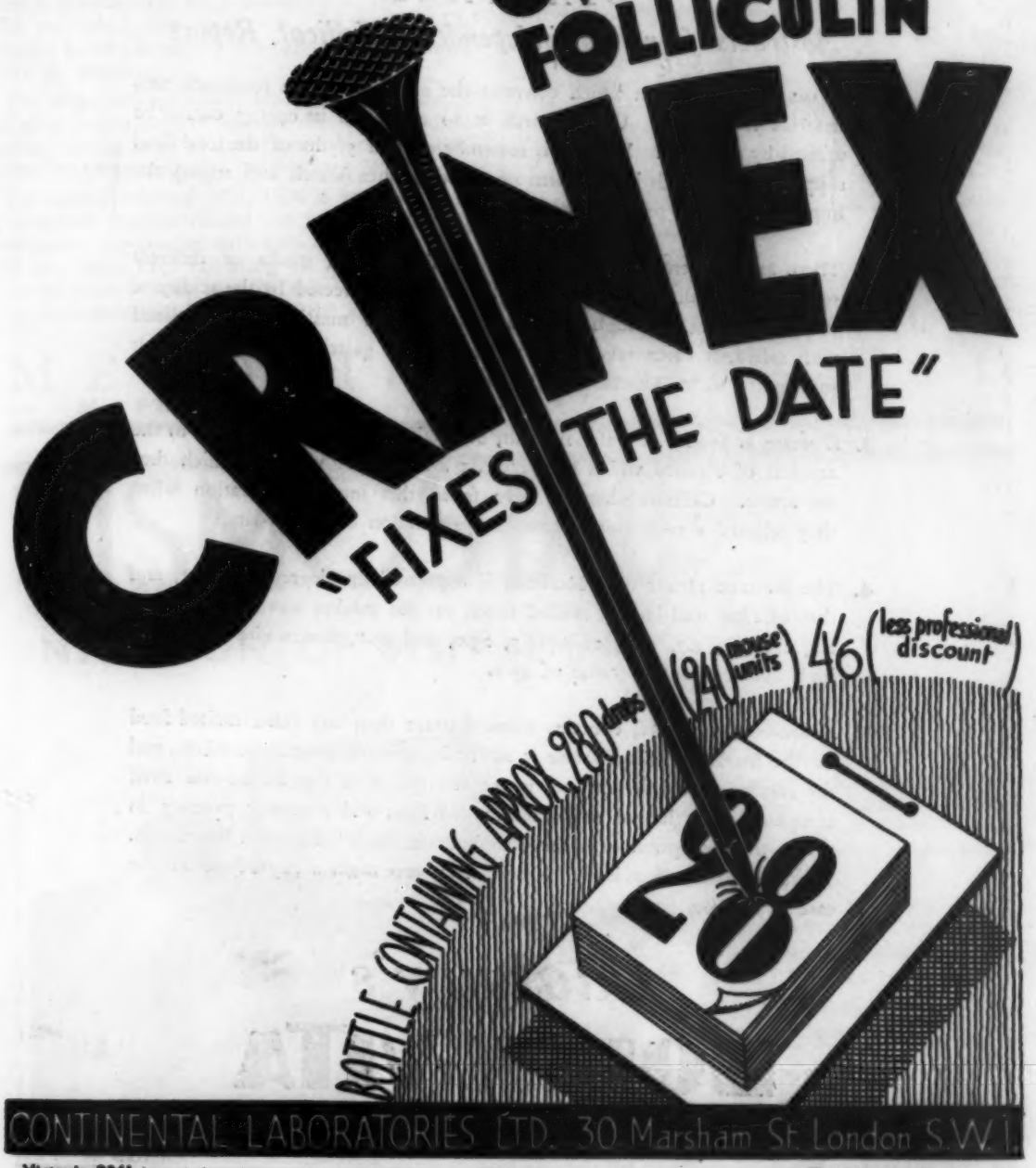

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No 8
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Abstracts from an independent Medical Report

1. Diastase is the ferment which converts the starch found in foodstuffs into dextrins and sugars. Unless starch is so converted its energy cannot be utilised by the body. When it is remembered that 5/7ths of the total food supply of mankind is in the form of carbohydrates (starch and sugar), the importance of this process is realised.

2. There are different kinds of diastase which act in media of different reactions. Ptyalin, the diastase of the saliva, is affected by the acidity of the gastric juice, although when a meal is well masticated and mixed with saliva, it often takes a long time for the gastric juices to acidify it sufficiently to inhibit the diastatic action.

3. Diastase is found naturally in malt, but malts vary considerably as to the amount of diastase which they contain and the pH value at which they are active. Cadbury chemists have taken this into consideration when they selected a malt suitable for the preparation of Bourn-vita.

4. The diastatic power of a foodstuff is expressed in degrees Lintner, and that of nine well-known malted foods on the market was found to be 2.2, 2.4, 3.2, 4.7, 14.7, 20.4, 20.5, 29.0, and 49.8, Bourn-vita having the high average Lintner value of 49.8.

5. Bourn-vita, therefore, contains more diastase than any other malted food on the market. This diastase is active in spite of gastric secretions, and the results of this activity are better absorption of the Bourn-vita itself compared with that of any other malted food and a greater potency in aiding the absorption of other carbohydrate foods taken with Bourn-vita. There is no ill effect likely to arise from too rapid a sugar-load in the case of diabetic patients.

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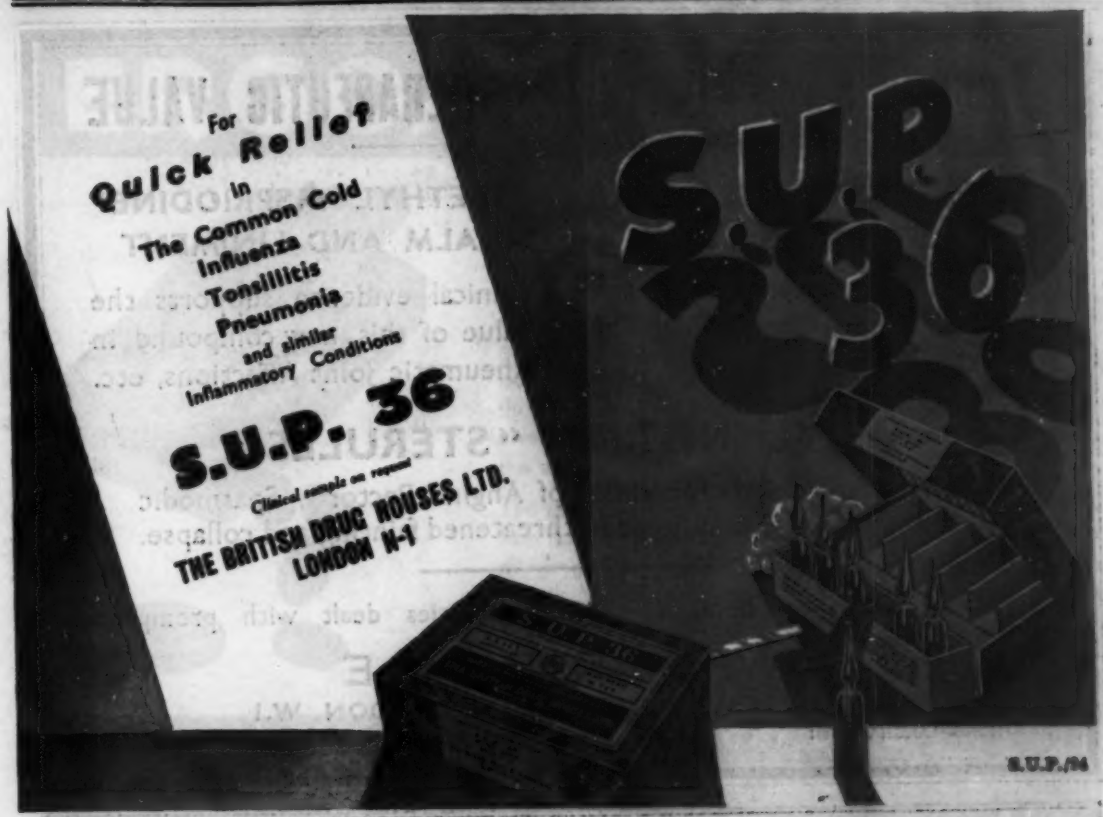

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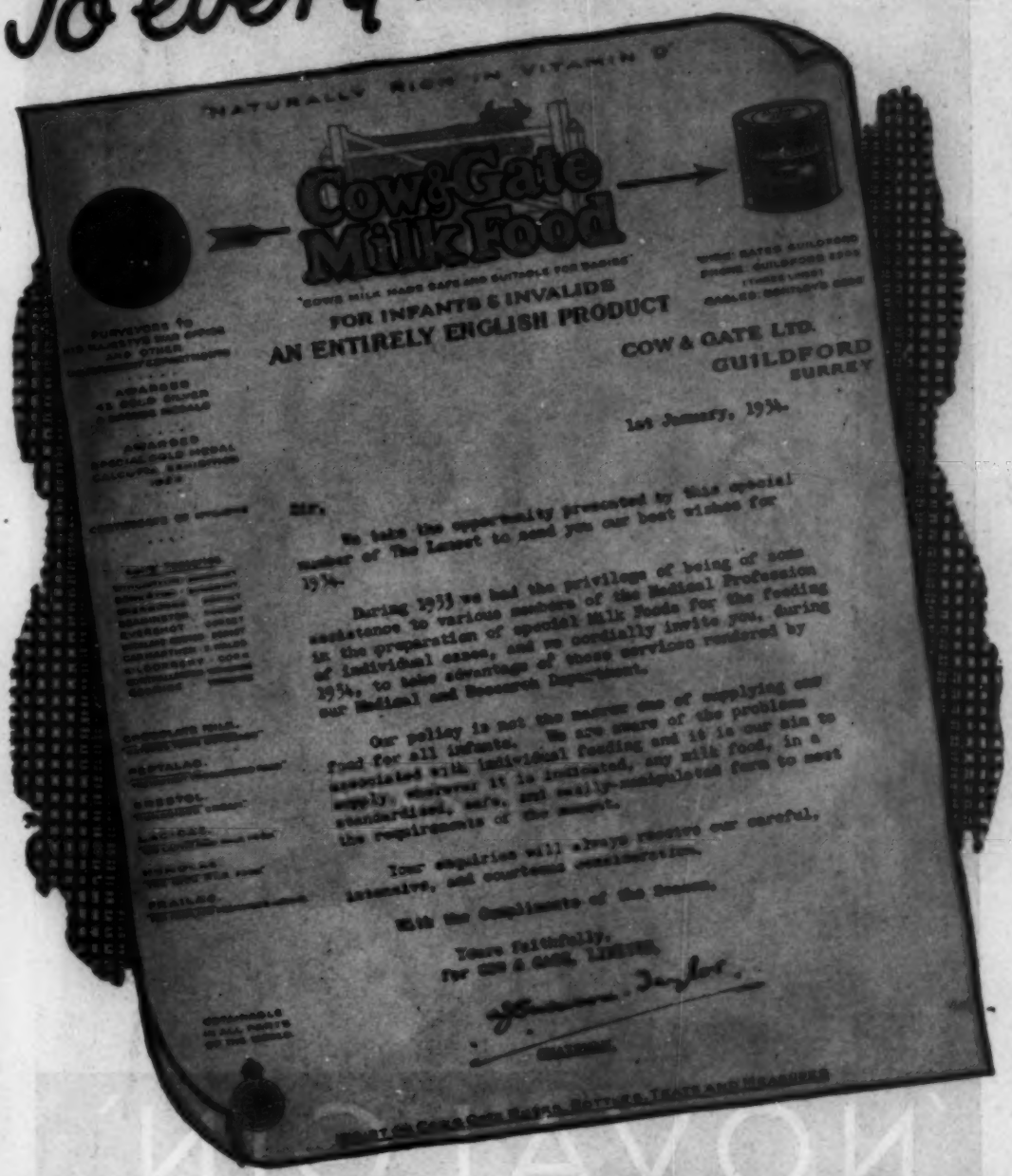
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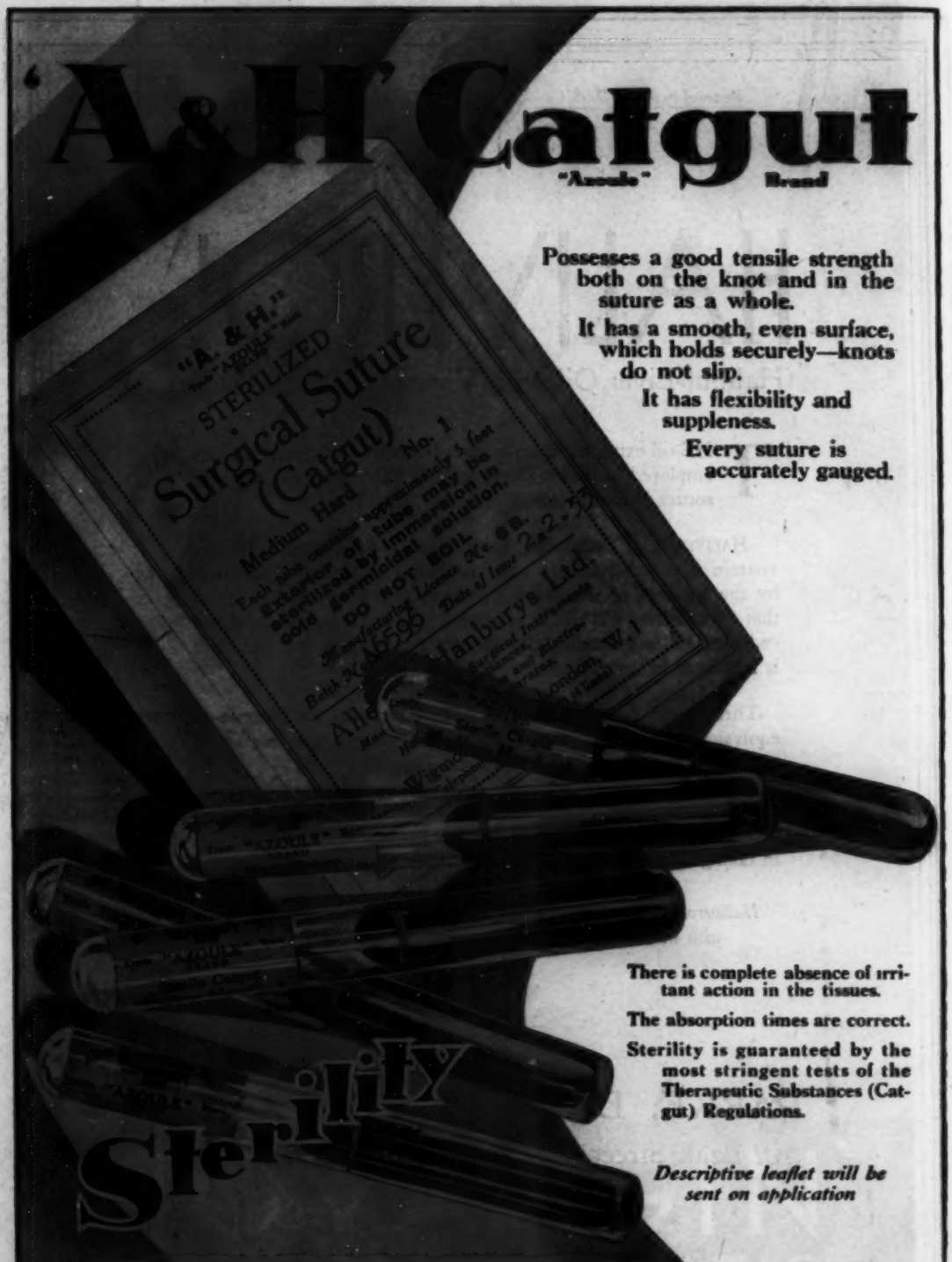

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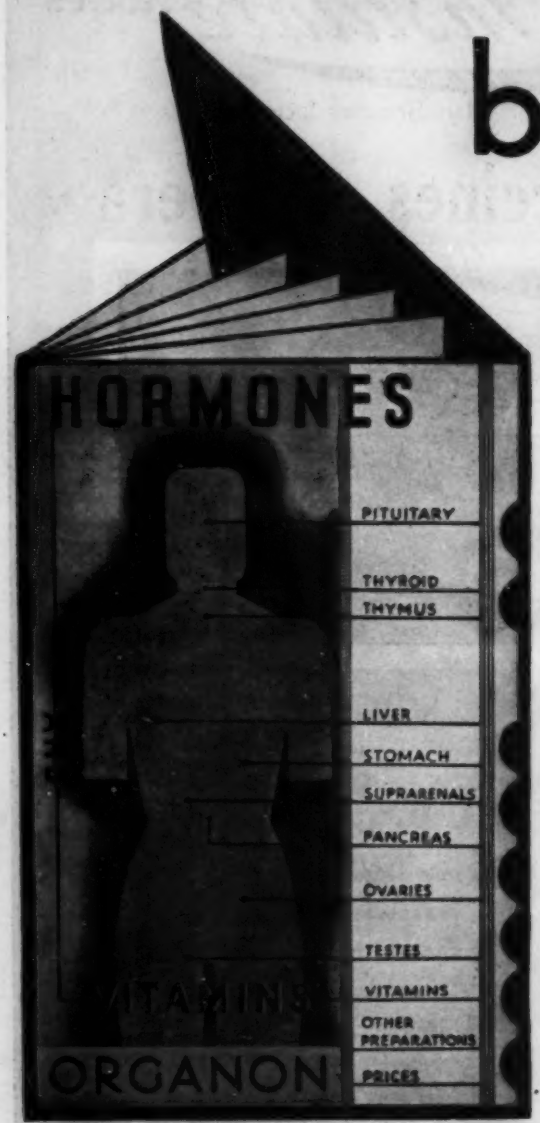

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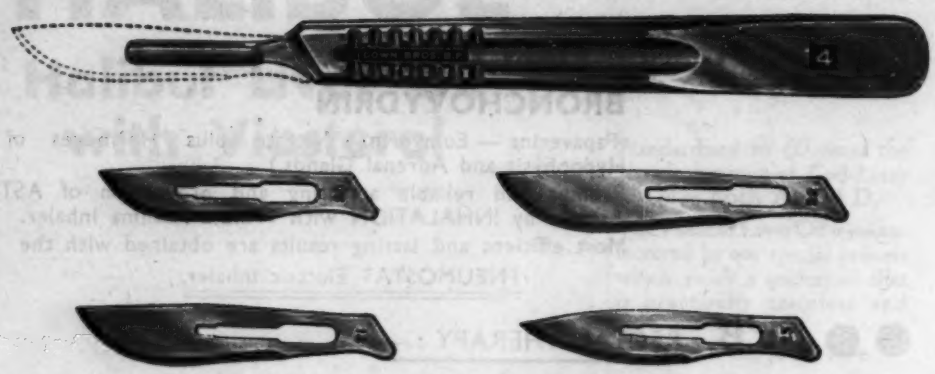

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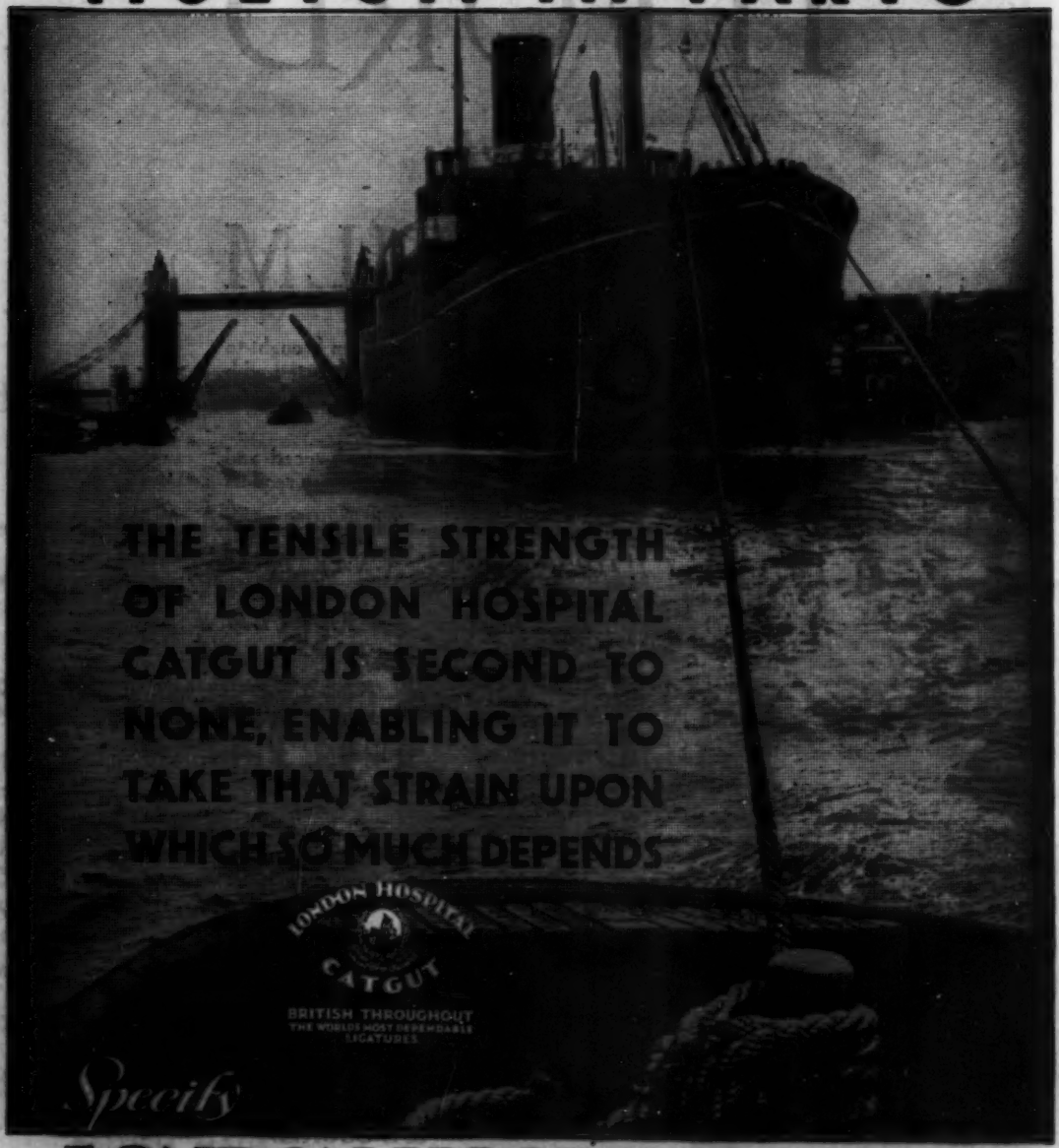

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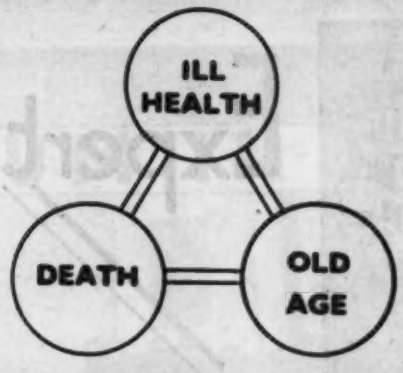

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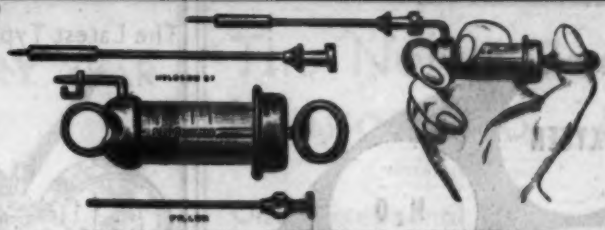

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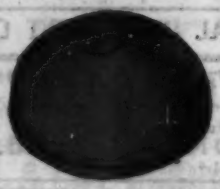

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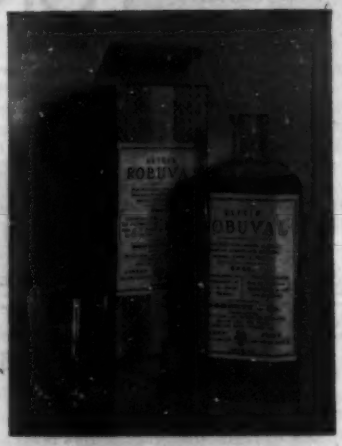

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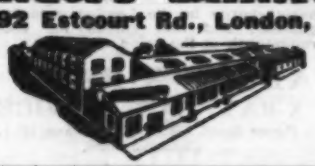

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LADIES' TRAVELLING COMPANIONS. For all MENTAL and NERVE Cases. *All Nurses fully insured against Accident*

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This Registered Hospital for the Treatment and Care, at moderate charges, of Mental Patients belonging to the educated classes, stands in a healthy and pleasant situation on Headington Hill, near Oxford. Voluntary Patients are also received for treatment. For further particulars apply to the Medical Superintendent.

HEIGHAM HALL, NORWICH

A PRIVATE MENTAL HOME situated in 14 acres of well-wooded grounds. For Ladies and Gentlemen suffering from Nervous or Mental Illness. Voluntary Patients, Temporary Patients, and Patients under Certificates are admitted for Treatment. Fees: from 4 guineas a week upwards, according to requirements. A few vacancies exist for Ladies and Gentlemen at reduced fees on the recommendation of the Patient's own Physician.

Apply to Medical Superintendent.
Telephone: 80 Norwich.

BARNWOOD HOUSE, GLOUCESTER.

A REGISTERED HOSPITAL FOR THE CARE AND TREATMENT OF LADIES AND GENTLEMEN SUFFERING FROM NERVOUS AND MENTAL DISORDERS.

Within two miles of the G.W. Railway and L.M. & S. Railway Stations at Gloucester, the Hospital is easily accessible by rail from London and all parts of the United Kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of over 280 acres. Voluntary Boarders of Both Sexes are also received for treatment.

Special accommodation for Lady Voluntary Boarders is also provided at the MANOR HOUSE, which has its own private grounds and is entirely separate from the main Hospital.

For particulars as to terms, &c., apply to ARTHUR TOWNSEND, M.D., Medical Superintendent.

Telephone: No. 6207 Barnwood.

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GREEN LANES,

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A PRIVATE HOME for the treatment of patients of both sexes suffering from Mental Illnesses.

Six acres of ground, highly situated, facing Finsbury Park.

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(18 MILES FROM LONDON.)

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HOME for few LADIES Mentally Afflicted. Large grounds. Liverpool st. 26 min. Stations Brentwood, Shenfield, one mile. Boarders received.

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This Institution is exclusively for the reception of a limited number of PRIVATE PATIENTS of both sexes, of the UPPER and MIDDLE CLASSES, at moderate rates of payment. It is beautifully situated in its own grounds, on an eminence a short distance from Nottingham, and commands an extensive view of the surrounding country; and from its singularly healthy position and comfortable arrangements affords every facility for the relief and cure of those mentally afflicted. For terms, &c. apply to the Medical Superintendent.

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A PRIVATE MENTAL HOSPITAL FOR THE TREATMENT AND CARE OF MENTAL AND NERVOUS DISORDERS IN BOTH SEXES.

Now removed to—

CHISWICK HOUSE, PINNER, MIDDLESEX.

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A modern country house, 12 miles from Marble Arch, in beautiful secluded grounds.

Fees from 10 guineas per week inclusive.

Cases under certificate and Voluntary Patients received for treatment.

Special provision for "Temporary" Patients under the new Mental Treatment Act. DOUGLAS MACAULAY, M.D., D.P.M.

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A PRIVATE HOME for the treatment of gentlemen suffering from Mental and Nervous illness, including the allied Disorders of Alcoholism and the Drug Habit. All types of early Mental and Nervous Cases are received without Certificates as Voluntary Boarders. Bracing hill country. See "Medical Directory," p. 2219.—Apply to Medical Superintendent. 'Phone 10 P.O. Church Stretton.

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Situated in 3½ acres of secluded gardens.

HOME FOR TWELVE MENTAL PATIENTS (LADIES).

Well-appointed private house. Home comforts and Trained Nursing Staff. Eminent Mental Specialist Visiting Physician.

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FOR MENTAL DISORDERS,
NORTHAMPTON

FOR THE UPPER AND MIDDLE CLASSES ONLY.

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, G.M.C., A.D.C.
MEDICAL SUPERINTENDENT: DANIEL F. RAMBAUT, M.A., M.D.

This Registered Hospital is situated in 120 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble, temporary patients, and certified patients of both sexes, are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

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This is a Reception Hospital, in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the most modern treatment of Mental and Nervous Disorders. It contains special departments for hydrotherapy by various methods, including Turkish and Russian Baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical Baths, Plombières treatment, &c. There is an operating Theatre, a Dental Surgery, an X-ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High Frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupation therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The Seaside house of St. Andrew's Hospital is beautifully situated in a Park of 230 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout fishing in the park.

At all branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard court), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens and facilities are provided for handicrafts, such as carpentry, &c.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2256 and 2257 Northampton) who can be seen in London by appointment.

CHEADLE ROYAL MENTAL HOSPITAL, Cheadle, Cheshire.

This REGISTERED HOSPITAL, with a SEASIDE BRANCH at Colwyn Bay, N.Wales, is for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL AND NERVOUS DISEASES.

The Hospital is governed by a COMMITTEE, appointed by the TRUSTEES of the Manchester Royal Infirmary.

In addition to the Main Buildings there are separate villas. Extensive grounds. Hard and grass tennis courts, cricket and croquet grounds, and a court for badminton. There are also wireless installations. Golf may be had within easy distance. Occupational Therapy.

VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS received.

The Hospital is nine miles from Manchester, 50 minutes by rail from Liverpool, and 3½ hours from London.

For terms and further particulars apply to the Medical Superintendent, J. A. C. Roy, M.B., who may be seen in Manchester BY APPOINTMENT. *Telephone; Gatley* 2231 (3 lines).

CAMBERWELL HOUSE

Telegrams: "PSYCHOLIA, LONDON." 32, PECKHAM RD., LONDON, S.E.5. Telephone: Rodney 4731, 4732

For the treatment of MENTAL DISORDERS.

Also completely detached Villas for Mild Cases, with private suites if desired. Voluntary Patients received. Twenty acres of Grounds, Hard and Grass Tennis Courts, Putting Greens, Bowls, Croquet, Squash Rackets, and all indoor amusements, including Wireless and other Concerts, Occupational Therapy, Calisthenics, and Dancing Classes. X-Ray and Actino-therapy, Prolonged Immersion Baths, Operating Theatre, Pathological Laboratory, Dental Surgery, and Ophthalmic Department. Chapel. Senior Physician: Dr. HUBERT JAMES NORMAN, assisted by three Medical Officers, also resident, and visiting Consultants. An Illustrated Prospectus, giving fees which are strictly moderate, may be obtained upon application to the Secretary.

The Convalescent Branch is Hove Villa, Brighton, and is 200 feet above sea level.

SHAFTESBURY HOUSE

FORMBY-BY-THE-SEA, Nr. LIVERPOOL.

Specially built and licensed for the care and treatment of a limited number of Ladies and Gentlemen suffering from NERVOUS and MENTAL breakdown. Voluntary and certified patients received. Ladies also admitted as Temporary Patients without certification. Terms moderate. *Apply* RESIDENT PHYSICIAN. *Tel. No. 8 Formby.*

HAYDOCK LODGE,
NEWTON-LE-WILLOWS, LANCASHIRE.

For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Diseases, either voluntary or under certificate. Patients are classified in separate buildings according to their mental condition.

Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *'Phone:* 11, Ashton-in-Makerfield.

THE LAWN, LINCOLN.

Telegrams: LAWN, LINCOLN. *Telephone:* LINCOLN 165.

A registered Hospital, situated in large grounds near the Cathedral, receives PRIVATE VOLUNTARY and CERTIFIED PATIENTS of both sexes for treatment of Mental and Nervous Disorders, including Post-Encephalitic conditions in adults. Special facilities for Psychotherapy in co-operative cases. All particulars may be obtained from the Resident Medical Superintendent.

BETHLEM ROYAL HOSPITAL

FOR NERVOUS AND MENTAL DISORDERS

Monks Orchard, Monks Orchard Road, Eden Park, Beckenham, Kent.

Reg. Tel. Address: BETHLEM, BECKENHAM. *Telephone:* SPRINGPARK 1180–1181.

Station: EDEN PARK (Southern Railway).

President: LORD WAKEFIELD OF HYTHE, C.B.E., LL.D. *Treasurer:* Sir LIONEL FAUDEL-PHILLIPS, Bart.

Physician-Superintendent: J. G. PORTER-PHILLIPS, M.D., F.R.C.P.

This Registered Hospital is now situated at Monks Orchard, in some 250 acres of park, pleasure and farm grounds. Applications can be considered on behalf of patients of the educated classes in a presumably curable condition.

With a view to early treatment, voluntary or uncertified patients are admitted.

Patients who can contribute 5 guineas weekly towards the cost of treatment and maintenance may be received as vacancies arise. The Committee will also consider applications for admission at lower rates and in certain cases will be prepared to admit patients free of charge.

Every facility for specialised investigation and treatment is provided in the Lord Wakefield Science and Treatment Unit. In this Unit is found the X-Ray and Dental Departments, and the Bio-Chemical, Pathological, and Psychological Laboratories.

Furthermore, provision is made for Electro-Therapy and Hydro-Therapy to be carried out in all their forms, and occupational therapy under competent instruction is encouraged.

In addition to the Resident Medical Staff, Consultants in special branches of Medicine and Surgery are available whenever required.

The comfort of sensitive patients is greatly enhanced by the fact that the majority are given single bedrooms.

For forms and further particulars apply to the Physician-Superintendent at the Hospital.

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(Within two hours of London.) **ESTABLISHED 1822.**

Home life for Ladies and Gentlemen MENTALLY AFFLICTED. Voluntary Patients received without Certificates. The Retreat is pleasantly situated in extensive grounds on the banks of the River Coine, a part of which celebrated trout stream flows through the Estate. There is every facility for sport and Occupational Therapy. The neighbourhood abounds in pleasant walks, and Fairford, being in the Cotswolds on a dry oolitic soil, is remarkably healthy. Own farm and dairy produce.

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Extensive grounds. Detached Villas. Chapel. Garden and Dairy produce from own farm. Terms very moderate.

CONVALESCENT HOME AT BOURNEMOUTH Detached Villas standing in 12 acres of ornamental grounds, with tennis courts, etc., which Voluntary, Temporary, or Certified Patients may visit by arrangement for long or short periods.

Illustrated Brochure on application to the Medical Superintendent. The Old Manor, Salisbury. Telephone: 51.

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First opened in 1898 and rebuilt in 1925 on the Cotswold Hills seven miles from Cheltenham, for the treatment of Pulmonary and all other forms of Tuberculosis. Aspect S.S.W., sheltered from North and East, elevation 800 feet. Pure bracing air. SPECIAL TREATMENT by artificial PNEUMOTHORAX (X-Ray controlled) TUBERCULINS, MEDICATED INHALATIONS by means of the APNEU INHALATION, INSTALLATION, and ULTRA-VIOLET RAYS is available when necessary without extra charge. X-RAY plant, Electric light Radiators, hot and cold basins, and Wireless in all rooms. Up-to-date drainage. Full day & night Nursing Staff.

Medical Superintendent: GEOFFREY A. HOFFMAN, B.A., M.B., T.C. Dub. *Assistant Physician:* MARGARET A. HARRISON, M.B., B.S. Lond. *Consulting Laryngologist:* SIDNEY BERNSTEIN, M.R.C.S. Eng., L.R.C.P. Lond. (attends regularly).

Telephone: 41 Witcombe. *Apply: The Secretary, The Cotswold Sanatorium, Cranham, Gloucester. Telegrams:* "Hoffman, Birdlip."

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FOR THE DIAGNOSIS AND TREATMENT OF ALL FORMS OF TUBERCULOSIS

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Southern aspect. Low rainfall. Pure bracing air. Sheltered grounds. Beautiful surroundings. All modern equipment for diagnosis and treatment, including operating theatre. **No extra charge for X Rays, Artificial Pneumothorax, Ultra-Violet Light, or other special treatment.**

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Inclusive Terms: SEVEN GUINEAS A WEEK.

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Unrivalled suites of Baths for Ladies and Gentlemen, including Turkish and Russian Baths, Air and Vichy Douches, Massage and Fibrolites Treatment, and Electric Installation for Baths and other Medical Purposes, Dowsing Radiant Heat, Infra Red Light, Artificial Sunlight, D'Arsonval High Frequency, Diathermy, Nauheim Baths, Sapphire Foam Baths, etc. "Certified" Milk from own farm of 300 acres. Large Winter Garden. Permanent Orchestra. Special provision for Invalids. Night attendance. Rooms well ventilated and all bedrooms warmed in Winter. A large Staff (upwards of 60) of trained Male and Female Nurses, Masseurs and Attendants.

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MATLOCK

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RECENTLY OPENED FOR THE TREATMENT OF PULMONARY TUBERCULOSIS.

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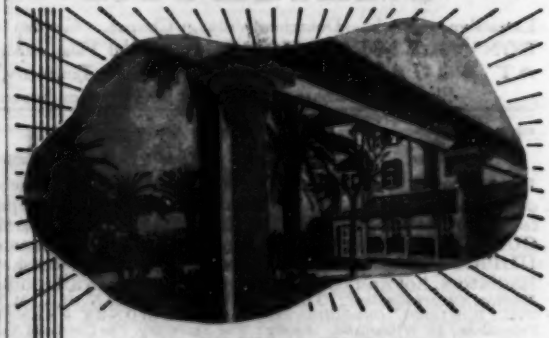

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DAVOS, SWITZERLAND

Altitude 5,200 feet

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Details from the Medical Superintendent, B. HUDSON, M.A., M.D., M.R.C.P., Swiss Federal Diploma, or the Manager, A. KUHN.

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Specially established in 1900 for carrying out the open-air treatment of TUBERCULOSIS on Nordrach lines. Now supplemented by Artificial Pneumothorax (X-Ray control) and other more recent methods when necessary.

The Sanatorium, situated in its own Park with fine sea and mountain views, has the advantage of miles of specially laid out and graduated walks rising through the pine-clad hills. There is a full Day and Night Nursing Staff. Equipment is modern; Electric Light, Central Heating, Wireless installed. Milk is specially obtained from a herd of tuberculin-tested cattle. Communication direct with LONDON, IRELAND, LIVERPOOL, and Midland Towns. (L. M. & S. Main Line.)

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For particulars apply to the Secretary, Pendyffryn Hall, Penmaenmawr, N. Wales. 'Phone 20

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Ladies and Gentlemen treated in small Private Home.

EXCELLENT RESULTS FROM MODERN TREATMENT.
SPLENDID CLIMATE. AMPLE AMUSEMENT.
MODERATE INCLUSIVE TERMS.

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As founded and established by the late Dr. FRANCIS HARE, for 20 years Med. Supt. of The Norwood Sanatorium, and author of "Alcoholism," etc.; for the treatment of ALCOHOLISM, other Drug Habits, Insomnia, Neurasthenia, Functional Nervous Disorders, etc.

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Fees 5 to 10 guineas. 25 bedrooms, ample amusements.
Annexe for Mild Cases. Quiet and pleasant situation.

Ladies and gentlemen admitted for treatment.

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'Phone: Chislehurst 451. Telegrams: "Masters," Chislehurst

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For LADIES and GENTLEMEN of Unsound Mind.

Terms moderate: Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone: No. 2 MALLING.

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CLIFFDEN, TEIGNMOUTH, in connection with Court Hall, for EARLY and CONVALESCENT CASES.

Cliffden is a large, well-appointed house with lovely views of the South Devon Coast. It is beautifully situated in grounds of 24 acres. The gardens are very attractive, and there is a private road to the beach.

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FOR MENTAL AND NERVOUS DISORDERS

(20 miles from London.)

Ladies suffering from all forms of MENTAL ILLNESS are received for treatment, on modern lines, as Voluntary, Temporary or Certified Private Patients at the Hill End Hospital. Convalescent or mild cases can be treated in a delightful country mansion, with extensive grounds, known as

HIGHFIELD HALL,

situate about a mile away from the Hospital.

FEES TWO TO THREE GUINEAS PER WEEK.

For further particulars apply to the Medical Superintendent, W. J. T. KNIGHT, L.R.C.P., D.P.M.,

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For Mental Cases with or without Certificates.

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A PRIVATE HOME for the care and treatment of a limited number of NERVE AND EPILEPTIC PATIENTS. Family life with individual attention. Trained Nurse. Ground 100 acres. Out-door life and recreations. Medical references England—Ireland.

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Climate healthy and bracing.

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For particulars apply to the Medical Superintendent at the Hospital, or to the Chief Officer, Mental Hospitals Department, The County Hall, Westminster-bridge, S.E.1.

Telegraphic Address: "Relief, Old Catton." Telephone: 290 Norwich.

NERVOUS & MENTAL AFFECTIONS

Ladies only received

The Grove, Old Catton, Norwich.

A High-class Home for the Curative Treatment of Nervous Affections. Voluntary Boarders are also received without certificates.

For full particulars apply to the Misses MCLINTOCK, or to Dr. S. BARTON, 34, Surrey-street, Norwich, Visiting Physician.

Metropolitan Hospital, Kingsland-road, E.8.—There is a vacancy for One CASUALTY OFFICER (Male). Salary £100 per annum. The appointment is for a period of six months, commencing on the 1st February, 1934.

Candidates must possess a registered Medical and Surgical qualification of the United Kingdom.

Applications, with copies of three recent testimonials, and a certificate of ability to administer Anæsthetics, to be sent forthwith to the undersigned. GEO. W. COOLING, Secretary.

The Queen's Hospital for Children,

Hackney-road, London, E.2.

The Committee invite applications for the post of Temporary ASSISTANT SURGEON for one year, with charge of beds. Two attendances required weekly. An honorarium to cover travelling expenses will be paid. Candidates must be Fellows by examination of the Royal College of Surgeons. Applications, with copies of three recent testimonials, which may be printed or typewritten, should be sent as soon as possible to the undersigned, from whom further particulars may be obtained.

21st December, 1933. CHARLES H. BESSELL, Secretary.

London Hospital, E.1.

Applications are invited for the post of MEDICAL FIRST ASSISTANT AND REGISTRAR. The appointment is for one year, but is renewable annually, on application, for two further periods of one year. Salary £300 per annum, payable by the Hospital and Medical College jointly.

Candidates must be fully qualified medically. Applications should arrive at the Hospital not later than by the first post on Saturday, January 13th. Further particulars may be obtained from the House Governor.

ARTHUR G. ELLIOTT, House Governor

London Hospital, E.1.

Applications are invited for the post of SURGICAL FIRST ASSISTANT AND REGISTRAR. There are two vacancies. Candidates must be Fellows of the Royal College of Surgeons. The salary is £300 per annum, payable by the Hospital and Medical College jointly.

The appointment is for one year, but is renewable annually, on application, for two further periods of one year. Applications should arrive at the Hospital not later than by the first post on Saturday, January 13th, 1934.

Further particulars may be obtained from the House Governor. ARTHUR G. ELLIOTT, House Governor.

London Hospital, E.1.—There is a vacancy for the post of an ASSISTANT SURGEON, who shall also be Assistant Surgeon to the Orthopædic Department.

Candidates must be Fellows of the Royal College of Surgeons, England.

Particulars of the appointment may be obtained on application to the House Governor.

The latest date for receiving applications is January 13th, 1934.

ARTHUR G. ELLIOTT, House Governor.

December, 1933.

The Victoria Hospital for Children,
Tite-street, Chelsea, S.W.3. (138 Beds.)

The Committee of Management invite applications for the post of HONORARY SURGICAL REGISTRAR, vacant 1st February, 1934. Candidates are expected to call on members of the Honorary Surgical Staff. The appointment is for one year, renewable for a second year.

Applications, with copies of three recent testimonials, should be sent to the Secretary not later than Monday, the 22nd January, 1934. By order.

D. ST. JOHN BAMFORD, Secretary.

The Victoria Hospital for Children,
Tite-street, Chelsea, S.W.3. (138 Beds.)

The Committee of Management invite applications for the posts of HOUSE PHYSICIAN and HOUSE SURGEON (both vacant 1st February, 1934). The appointments are for six months. Salaries at the rate of £100 per annum, with board, lodging, and washing.

Candidates must attend the Hospital for the purpose of an interview at 4.30 P.M. on Friday, the 19th January, 1934. (No travelling or other expenses will be paid). They must hold medical and surgical qualifications, and be registered under the Medical Act.

Applications, with copies of three recent testimonials, should be sent to the Secretary not later than first post on Thursday, the 18th January, 1934.—By order.

D. ST. JOHN BAMFORD, Secretary.

West London Hospital, Hammersmith-road, W.6.
—Required, a RESIDENT ANÆSTHETIST (Male). The appointment is tenable from 22nd January next to 30th June, subject to one month's notice on either side. Salary at the rate of £100 a year, with board, lodgings, and laundry allowance.

Candidates must be registered under the Medical Act. Applications (which must be made on printed forms obtained from me) must reach me not later than the 1st post on Friday, 12th January. Selected candidates will be required to call upon such members of the Medical Staff as directed, to be in attendance at the Medical Council Meeting on Friday, 19th January, at 4.30 P.M. and the House Committee Meeting at 5 P.M. the same day, when the appointment will be made.

H. A. MADGE, Secretary.

County Council of Middlesex.

ASSISTANT DENTAL OFFICER.

The County Council invites applications for the above appointment. Applicants must be fully qualified and registered Dental Surgeons.

The duties of the post are the dental inspection and treatment under the Education and Maternity and Child Welfare Acts.

The officer appointed, who will be entitled to one month's holiday annually, will be required to devote his or her whole time (including Saturday mornings) to the duties of the post, will not be allowed to engage in private practice, will be under the supervision of the County Medical Officer and the Senior Dental Officer, and must be prepared to reside in such district as may be required.

Salary £500 per annum, rising by annual increments of £25 to £700.

The appointment will be during the pleasure of the Council, and subject to one month's notice on either side.

The successful candidate will be required to pass such medical examination as the County Council may direct, and to contribute to the County Council's Superannuation Fund.

Applications, stating name, age, qualifications, and experience, together with copies of not more than three recent testimonials, must be received by the undersigned not later than 13th January. Special application forms are not provided. Envelopes must be endorsed "Assistant Dental Officer."

Canvassing, directly or indirectly, will be a disqualification.

ERNEST S. W. HART, Clerk of the County Council.
Middlesex Guildhall, Westminster, S.W.1.
18th December, 1933.

Graham Scholarship in Pathology.

The Senate of the University of London invite applications for the Graham Scholarship in Pathology, value £300 per annum, in the first instance for two years; founded under the will of the late Dr. Charles Graham to enable "a young man to continue his pathological researches and at the same time to secure his services to the School of Advanced Medical Studies connected with University College Hospital as a Teacher under the direction of the Professor of Pathology."

The successful candidate will, if possible, take up the scholarship as from 24th April, 1934. The Scholarship is in no way restricted to students of Medical Schools of the University. Applications must be made to the undersigned before 31st January, 1934. Further particulars should be obtained from the Academic Registrar, University of London, South Kensington, S.W.7, or from Prof. A. E. Boycott, at University College Hospital Medical School, Gower-street, W.C.1.

EDWIN DELLER, Principal, University of London.

St. Mark's Hospital for Cancer,
FISTULA, AND OTHER DISEASES OF THE RECTUM, City-road, E.C.1.

The Committee of Management invite applications for the post of ANÆSTHETIST to attend operations on WEDNESDAY AFTERNOONS. Honorarium £25 per annum. Candidates must be fully qualified, and with Hospital experience. Applications should reach the Secretary at the Hospital not later than 12th January, 1934.

REVISED NOTICE.

National Temperance Hospital,
Hampstead-road, N.W.1.

Applications are invited for the post of OFFICER in Charge of the X-RAY THERAPY DEPARTMENT.

Candidates must possess the D.M.R.E. Diploma; also for a MEDICAL OFFICER in Charge of the PHYSICO-THERAPY DEPARTMENT.

Applications, accompanied by copies of not more than three testimonials, must be submitted by Thursday, 11th January, 1934, addressed to the Secretary.

Central London Throat, Nose, and
EAR HOSPITAL, Gray's Inn-road, W.C.1.

ASSISTANTS IN THE OUT-PATIENT DEPARTMENT.

There is the following vacancy:—

FIRST ASSISTANT. Saturdays, 2 P.M.

The duties are to assist the Surgeons, and the post is an honorary one.

Applications, which may be for periods of three, six, or twelve months, should be sent to the undersigned immediately.

JOHN H. YOUNG, Secretary-Superintendent.

The Middlesex Hospital, W.1.

A vacancy is hereby declared for a PHYSICIAN to the Children's Department of the Hospital.

Applications for this office are invited to be sent to the undersigned by Saturday, 13th January, 1934, accompanied by diplomas and testimonials.

Candidates must be members (or have passed the qualifying examination for the membership) of the Royal College of Physicians of London.

By order of the Board.
S. R. C. PLIMSOLL, Secretary-Superintendent.

Western Ophthalmic Hospital,
155, Marylebone-road, N.W.1.

Applications are invited for the post of SENIOR and JUNIOR RESIDENT HOUSE SURGEONS.

The salaries are at the rate of £150 and £100 per annum respectively, and the appointments are for six months.

Some previous ophthalmic experience is required.

The Senior is required at an early date, and the Junior on the 14th February.

Applications, accompanied by copies of three testimonials, should reach me by January 20th. Candidates should state in their application whether they are prepared to accept either post. H. W. BURLEIGH, Honorary Secretary.

County Borough of West Ham.

MEDICAL OFFICER OF HEALTH'S DEPARTMENT.

PLAISTOW FEVER HOSPITAL.

The Council invite applications for the appointment of a Male SENIOR RESIDENT MEDICAL OFFICER at the above-mentioned Hospital. Accommodation, 210 beds.

The salary will be at the rate of £350 per annum, rising by annual increments of £25 to a maximum of £450 per annum, with residential allowances, subject to the appropriate abatement in accordance with the resolution of the Council for the time being in force—namely, 2½ per cent. from the first £200, 3½ per cent. from next £100, and 5 per cent. from the remainder.

Candidates must be fully qualified and registered Medical Practitioners, must have held a previous residential appointment in a Fever Hospital, and preference will be given to candidates with residential experience in a General Hospital.

The successful candidate will be required to pass a medical examination, and the appointment will be subject to the provisions of the Local Government and Other Officers' Superannuation Act, 1922, and the statutory contributions under the Act will be deducted from the salary.

Forms upon which application must be made can be obtained from the Medical Officer of Health, Municipal Health Offices, Romford-road, West Ham, E.15, and must be returned to the Town Clerk, Town Hall, West Ham, E.15, not later than Monday, January 15th, 1934.

CHARLES E. CRANFIELD, Town Clerk.

St. John's Hospital, Lewisham, S.E.13.

Applications are invited for the Three Resident Posts of HOUSE SURGEON, CASUALTY OFFICER, and HOUSE PHYSICIAN (Males), vacant on 1st February, 1934. Tenable for six months. Remuneration £100 per annum.

Applications, with copies of testimonials, should reach the undersigned by January 18th.

J. C. GILBERT, Secretary-Superintendent.

Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.1.

Applications are invited from registered Medical Practitioners for the posts of SENIOR and JUNIOR HOUSE SURGEON, which will become vacant on January 31st. The Junior House Surgeon is a candidate for the Senior post. Salary £120 and £100 per annum respectively, with board and residence.

Applications, with copies of three testimonials, should reach the undersigned on or before January 12th.

GEORGE WATTS, Secretary.

Resident Medical Officer required for STOKE NEWINGTON DISPENSARY, High-street, Stoke Newington. Whole-time Lady preferred.

Salary £200 a year, with residence, light, and fuel free. A further £120 will be paid to her for keeping a resident housekeeper and a non-resident charwoman to attend to the premises and for their sundry requirements.

Applications should be addressed to the Hon. Sec. of the Dispensary, and should reach him not later than January 15th.

Poplar Hospital for Accidents, East India Dock-road, Poplar, E.14.

The Committee invites applications for the appointment of SECOND RESIDENT OFFICER at a salary at the rate of £175 per annum, all found. Candidates must have held appointment as House Surgeon at a Hospital. Applications must be accompanied by a statement of the candidate's qualifications and be forwarded to the Secretary, with three recent testimonials, not later than Monday, January 29th, 1934. The appointment is for a period of six months.

London County Council.

Applications invited from Medical Practitioners for appointment as ASSISTANT MEDICAL OFFICER (Grade I.), at ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8. Salary £350, rising annually by £25 to £425, with full residential emoluments. Candidates must be Medical Practitioners of at least one year's standing, and have held a resident appointment in general hospital for at least six months. Experience in obstetrics desirable. No accommodation for a married man. Duties assigned by Medical Superintendent and include, if necessary, assistance at other establishments under Council's control. Remuneration and conditions of service subject to review.

Application forms obtainable (stamped, addressed foolscap envelope necessary) from Medical Officer of Health (Staff Division 3A), County Hall, S.E.1, returnable by 19th January. Canvassing disqualifies. Further enquiries should be addressed to Medical Superintendent at the Hospital.

South London Hospital for Women, Clapham Common, S.W.4.

A General Hospital for Women and Children (140 Beds), Medical, Surgical, Ear, Nose and Throat, Ophthalmic, Orthopædic, Skin, Urological, and other Special Departments.

Applications are invited from duly qualified Medical Women for the undermentioned appointments:—

SURGICAL REGISTRAR.—Half-time duty for a period of one year from March 1st, with eligibility for reappointment to a maximum of three years. Honorarium, 50 guineas per annum.

OUT-PATIENT MEDICAL OFFICER for half-time duty. This officer to have held a resident hospital appointment. Salary £100 per annum.

Candidates are requested to call on members of the Hon. Medical Staff before Saturday, February 3rd, by which date applications and copies of testimonials must reach the Secretary at the Hospital.

The Royal Eye & Ear Hospital, BRADFORD.

Wanted, JUNIOR HOUSE SURGEON (Male). Salary £150, with board, residence, and laundry.

Applications, stating qualifications, age, &c., with copies of recent testimonials, to be forwarded to the undersigned on or before January 17th.

F. BRIGGS, Secretary-Superintendent.

Preston and County of Lancaster ROYAL INFIRMARY. (300 Beds.)

The Board of Management invite applications from unmarried gentlemen, doubly qualified and registered, for the post of CASUALTY OFFICER (including duties under two Assistant Surgeons).

Total Resident Staff six.

Salary at the rate of £150 per annum, with board, residence, and laundry.

Applications, stating age, qualifications, and experience, accompanied by copies of testimonials, to be forwarded to the undersigned as soon as possible.

JOHN GIBSON, Superintendent and Secretary.

2nd January, 1934.

Barry Urban District Council. SURGICAL HOSPITAL.

HOUSE SURGEON (MALE).

Applications are invited for the above appointment.

Candidates must be duly qualified and registered. Salary £200 per annum, with board and lodging.

Preference will be given to a candidate with previous experience especially in the administration of anæsthetics.

The successful candidate must devote the whole of his time to the duties of his office, and to assist the Medical Staff, and act under the supervision of the Medical Superintendent, who is also Medical Officer of Health and School Medical Officer.

The appointment will be for a period of six months, to be renewed, if thought fit, for another period of six months, but not for any subsequent period.

The successful candidate will be required to commence duties on 1st February, 1934.

Applications, stating age, qualifications, positions held, with copies of three recent testimonials, to be sent to Dr. P. W. KENT, Medical Superintendent, Public Health Office, Barry, by first post on 20th January, 1934.

2nd January, 1934. (Signed) T. D. HOWELLS, Clerk.

Urban District Council of Enfield.

ASSISTANT MEDICAL OFFICER OF HEALTH.

The Urban District Council invites applications for the appointment of an Assistant Medical Officer of Health for Maternity and Child Welfare purposes.

Applicants (Female) should have had previous experience in dealing with diseases of babies and children, and of ante-natal and post-natal work.

The appointment will be part-time, and the person appointed will be required to attend at the Centres for two and a half hours on four afternoons and one morning per week. In addition, the person appointed will be required to attend on alternate Saturday mornings at the Maternity and Child Welfare Dental Clinic for the purpose of administering anæsthetics, and should have had special experience of this work. The person appointed will also be required to attend additional sessions during one month in the year when the present Assistant Medical Officer of Health is on holiday.

The person appointed will be required to carry out her duties under the supervision of the Medical Officer of Health.

The salary will be £300 per annum, and four weeks' holiday per annum will be allowed.

Applications, stating name and address, age, whether married or single, degrees, diplomas, and previous experience, and accompanied by copies of three recent testimonials, must be delivered to the undersigned, marked "Assistant M.O.H.," not later than noon on Saturday, the 27th January, 1934.

Candidates canvassing members of the Council, directly or indirectly, will be disqualified.

KENNETH TANSLEY, Clerk to the Council.

Public Offices, Enfield, Middlesex.

Somerset and Bath Mental Hospital, COTFORD, NORTON FITZWARREN, TAUNTON.

Applications are invited for the appointment of a RESIDENT SENIOR MALE ASSISTANT MEDICAL OFFICER, at an annual salary of £400, rising by annual increments of £25 to a maximum of £550, plus £50 per annum for Diploma in Psychological Medicine, with board, lodging, laundry, and attendance, valued for superannuation purposes at £146 per annum.

Candidates must be single, of not more than thirty-five years of age, legally qualified and registered, and with previous experience. They must also hold a Diploma in Psychological Medicine.

The appointment is subject to the provisions of the Asylums Officers' Superannuation Act, 1909, and terminable by one month's notice on either side.

The salary is subject to an economy cut in accordance with the recommendations of the Mental Hospitals Association, which cut will cease to operate on the 1st April next.

Applications, stating age, experience and qualifications, accompanied by three recent testimonials, must reach the Medical Superintendent by first post on the 16th January.

A. W. CALEY, Clerk to the Visiting Committee.

Dated the 28th December, 1933.

Essex County Hospital, Colchester.
(160 Beds.)

Wanted in January a HOUSE PHYSICIAN (Male). Salary £150 per annum, with board, washing, and residence in the Hospital. Medical and Surgical qualifications required.

Applications, with three recent testimonials, to be sent on or before Saturday, the 13th January, 1934, to

ALFRED G. BUCK, Secretary.

The Mount Vernon Hospital,
NORTHWOOD (FOR THE TREATMENT OF CANCER).

A HOUSE SURGEON will be required on February 1st.

Candidates must be fully qualified and registered.

Salary at the rate of £150 per annum; board, residence, &c. Six months' appointment.

Applications, with copies of three testimonials, to be addressed to the undersigned on or before Monday, 22nd January.

W. J. MORTON, Secretary.

Offices, 32, Fitzroy-square, W.1.

Cornelia and East Dorset Hospital,
POOLE, DORSET. (110 Beds.)

HONORARY STAFF.

The Committee of Management invite applications for the post of HONORARY SURGEON, very shortly to become vacant.

The Committee further invite applicants to state whether they would be willing to accept an alternative post of ASSISTANT SURGEON.

Preference will be given to Fellows of a Royal College of Surgeons.

Applications, stating age, experience, qualifications, and previous hospital appointments, accompanied by copies of three recent testimonials (which will not be returned), must reach the undersigned by Monday, the 15th January, 1934.

E. S. FOLEY, Secretary.

County Borough of Halifax.
ST. LUKE'S HOSPITAL.

JUNIOR RESIDENT MEDICAL OFFICER.

The Health Committee of the Halifax Corporation invite applications for the post of Junior Resident Medical Officer (Male, unmarried) for St. Luke's Hospital (containing 448 beds for Medical, Surgical, and Maternity cases). The salary will be £250 per annum, together with board, residence, and laundry. The appointment will be for a term not exceeding one year, and is not renewable. The duties will be chiefly concerned with the Maternity and Children's wards.

Applicants must be duly registered medical practitioners.

Forms of application and conditions of appointment may be obtained from the Medical Officer of Health, Powell-street, Halifax.

Completed applications, together with copies of not more than three recent testimonials, endorsed "Junior Resident Medical Officer," must be forwarded to the undersigned not later than first post on Monday, 22nd January, 1934.

Canvassing, either directly or indirectly, will be a disqualification.

PERCY SAUNDERS, Town Clerk.

Town Clerk's Office, Town Hall, Halifax, 1st January, 1934.

Rhondda Urban District Council.

ASSISTANT MEDICAL OFFICER.

The above Council invite applications from registered medical practitioners to act as WHOLE-TIME ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER under the direction and supervision of the Council's Medical Officer of Health, at a salary of £500, rising by annual increments of £25 to £700 a year, the first increment being payable on the 1st April, 1935; travelling expenses necessarily incurred in the performance of the duties also being allowed. The salary is subject to a temporary deduction of five, six, or seven per cent., according to the stage reached in the scale.

Candidates must have had not less than three years' professional experience subsequent to registration, and the possession of a Diploma in Public Health is desirable.

The duties will pertain to both the public health and school medical services, and experience in the diagnosis, prevention, and treatment of infectious diseases, the examination and certification of defective children, orthopædic work, X ray and ultra-violet radiation, and general anæsthesia for dental and throat operations will be considered to be of special importance.

The appointment, which will be terminable by two calendar months' notice on either side, will be subject to the approval of the Board of Education. The officer appointed will be required to reside within the Rhondda Urban District, and will not be allowed to engage in private practice.

Applications are to be made on forms obtainable from the Medical Officer of Health, Tydfil House, Llewelyn-street, Pentre, Rhondda, by whom they must be received, endorsed "Assistant Medical Officer," and accompanied by copies of three recent testimonials, not later than the first post on Saturday, the 20th January, 1934. D. J. JONES, Clerk of the Council.

The Council Offices, Pentre, Rhondda, 1st January, 1934.

Nottingham & Midland Eye Infirmary.

RESIDENT HOUSE SURGEON required end of January, 56 beds. Large Out-patient Department. Salary £200 per annum, with board and laundry. Applicants (male) should state age, qualifications, experience, and send copies of three recent testimonials to the Secretary, The Ropewalk, Nottingham 6th January, 1934.

Queen's Hospital, Birmingham.

Applications are invited for the post of NON-RESIDENT REGISTRAR to the Ear, Nose, and Throat Department for attendance on four mornings weekly, from 9 A.M. to 1 P.M.

Stipend £150 per annum.

Candidates must be registered medical practitioners, and preferably Fellows of the Royal College of Surgeons of England, and have held a resident appointment in a Teaching Hospital.

The appointment is for one year with eligibility for re-election.

Further particulars may be obtained from the undersigned, to whom applications should be sent, together with testimonials, by Saturday, January 13th, 1934.

G. HURFORD, House Governor.

South Devon and East Cornwall
HOSPITAL, PLYMOUTH. (240 Beds.)

Applications are invited for the post of RESIDENT ANÆSTHETIST AND HOUSE SURGEON to the Special Departments. (Male.)

Salary £120 per annum, with board, residence, and laundry. Appointment is tenable for six months, and is subject to renewal. Duties to commence 29th January. Candidates must be registered under the Medical Acts.

Applications, stating age, and qualifications, together with copies of recent testimonials, to be sent to the undersigned by the 17th January.

ARTHUR R. CASH,
1st January, 1934. General Superintendent and Secretary.

The Royal Hospital, Wolverhampton.
(Incorporated under Charter.)

HOUSE SURGEON required. Duties to commence February 1st, 1934.

The Hospital contains 300 beds, includes the usual special departments, and is recognised by the various Examining Bodies for a part of the requisite attendance on Medical and Surgical Practice.

Candidates must be registered under the Medical Acts, and unmarried.

The appointment is for six months. Salary at the rate of £100 per annum. Board, furnished rooms, and laundry provided.

Applications, with copies of testimonials, to be forwarded to the undersigned by January 16th, 1934. W. H. HARPER,
Wolverhamptom, 1st January, 1934. House Governor.

The Royal Infirmary, Sheffield.
(500 Beds.)

The Weekly Board of Management invite applications for the undermentioned posts, which are tenable for six months from 1st January, 1934:—

OPHTHALMIC HOUSE SURGEON,
ASSISTANT AURAL AND OPHTHALMIC HOUSE SURGEON, and
HOUSE PHYSICIAN TO DERMATOLOGIST.

The salary attached to each appointment is £80 per annum, with board and residence; after six months' service £100 per annum.

Applications, with copies of testimonials, to be sent to the undersigned forthwith.

JNO. W. BARNES, F.C.I.S.,
General Superintendent and Secretary.

Board Room, 27th December, 1933.

Hull Royal Infirmary. (367 Beds.)

Applications are invited from registered Medical Practitioners for the post of HOUSE SURGEON (Male) to the SUTTON BRANCH HOSPITAL, vacant January 15th.

Salary at the rate of £160 per annum, plus residence, board, and laundry.

The appointment will be for six months, but will at any time be determinable by one month's notice on either side.

The Branch Hospital is not a recovery annexe but a General Hospital of 100 beds, 55 of which are reserved for surgical cases.

The Infirmary is recognised by the Royal Colleges for the F.R.C.S. Examinations, and the post now advertised is approved by the University of London for the M.S. Branch I. (Surgery) Examination.

Applications, giving particulars of age, experience and nationality, together with copies of recent testimonials, should be addressed to the undersigned.

December 29th, 1933. R. J. CARLESS, House Governor.

The Jessop Hospital for Women,
SHEFFIELD. (143 Beds.)

The Board of Management invite applications for the post of HOUSE SURGEON (Male) for a period of six months, commencing 1st March, 1934.

Salary £100 per annum, together with board, residence, and laundry.

Applications, stating age, together with copies of testimonials, should be addressed to the undersigned not later than 9th January, 1934. DAVID OSWALD, Secretary.

Harrogate Royal Bath Hospital
(SPECIAL HOSPITAL FOR RHEUMATIC AND ALLIED DISEASES).

Applications are invited for the post of RESIDENT MEDICAL OFFICER (Male), to commence duties beginning 1st February, 1934.

The appointment will be for a period of six months. Salary at the rate of £156 per annum, with board, residence, and laundry.

Applications, stating qualifications, age, &c., with copies of recent testimonials, to be forwarded to the undersigned on or before Wednesday, 10th January, 1934.

E. P. L. DIXON, M.A., Secretary.

Harlow Wood Orthopædic Hospital,
near MANSFIELD, NOTTINGHAMSHIRE.
(120 Beds.)

Applications are invited for the posts of Two HOUSE SURGEONS (Male). The salaries are at the rate of £175 per annum with board, residence, and laundry. The duties may include attendance at the affiliated out-patient clinics.

The appointments will be for six months and may be renewed for a further six months.

Applications, stating age and experience, with copies of testimonials, should be received on or before January 16th, 1934, by the Secretary.

St. Mary's Hospitals,
MANCHESTER.

RESIDENT OBSTETRIC OFFICER for the WHITWORTH STREET WEST HOSPITAL (Maternity) for a period of twelve months from the 1st February next.

Salary £175 per annum, with board and residence. Membership of the College of Obstetricians and Gynæcologists would be an advantage.

Applications, with copies of three testimonials, to be sent to the undersigned on or before the 15th January.

R. RATCLIFFE, Secretary.

St. Mary's Hospitals,
MANCHESTER.

Two HOUSE SURGEONS for the WHITWORTH STREET WEST HOSPITAL (Maternity), and One for the WHITWORTH PARK HOSPITAL (Gynæcological Dept.), each for a period of six months from the 1st February next.

Salaries at the rate of £50 per annum, with board and residence.

Applications, with copies of three testimonials, to be sent to the undersigned on or before the 15th January.

R. RATCLIFFE, Secretary.

Coventry & Warwickshire Hospital.

(Main Hospital, 307 Beds, Convalescent Hospital, 40 Beds.)
Hospital recognised for the Diploma in Ophthalmic Medicine and Surgery.

Applications are invited for the post of HOUSE SURGEON Male) for the Aural and Ophthalmic Departments.

The appointment for six months, renewable. Salary £125 per annum, with board, residence, and laundry.

Candidates must be duly qualified and registered.

Applications, stating age and enclosing copies of recent testimonials, to be sent to the undersigned immediately.

(Miss) R. HOOPER, Secretary.

Northampton General Hospital.
(253 Beds.)

There will be a vacancy on the 1st February, 1934, for a HOUSE SURGEON for one of the Honorary Surgeons. British nationality. Salary £150 per annum, with board, residence, and laundry.

The successful candidate will be appointed for the period ending 31st March, 1934, and will be eligible for re-election for a further period of six months.

Candidates must be duly qualified and registered.

Applications, stating age, sex, qualifications, &c., with copies of testimonials, to reach the undersigned not later than first post on Wednesday, the 17th January.

H. ST. JOHN WOOD, Secretary-Superintendent.

27th December, 1933.

Bristol Eye Hospital

Applications are invited for the post of ASSISTANT RESIDENT HOUSE SURGEON. Salary £100 per annum. Vacant February 1st. Senior post available after six months. Applications and testimonials to be received by the Secretary not later than Monday, January 8th, 1934.

Royal Surrey County Hospital,
GUILDFORD. (184 Beds.)

WANTED, 1st FEBRUARY, HOUSE SURGEON (MALE). Salary £150 per annum, with board, residence, and laundry. Applications, stating age and essential particulars, with copies of not more than three testimonials, to be sent to the Secretary-Superintendent on or before the 9th January, 1934.

Seamen's Hospital Society, Greenwich.

HOUSE SURGEON (Male) required at TILBURY HOSPITAL, ESSEX, for six months from 1st February, 1934. Salary £140 per annum, with board, residence, and laundry. Good opportunity for minor surgery. Applications, with copies of three testimonials, to be sent in by January 17th to the undersigned. R. E. V. BAX, Secretary.

Seamen's Hospital, Greenwich, S.E.10.

The Children's Hospital, Sheffield.
(110 Beds.—Three Residents.)

Applications are invited for the following posts, vacant 1st February, 1934:—

RESIDENT MEDICAL OFFICER, who will have charge of all the Medical and Surgical Beds in the Hospital. Salary commencing £175 per annum, with board, residence, and laundry. Previous resident experience essential.

HOUSE PHYSICIAN. The appointment is for six months. Salary £100 per annum, with board, residence, and laundry.

Candidates (Male and unmarried), who must possess registered qualifications, should forward applications, stating age, nationality, &c., together with copies of three recent testimonials, to the undersigned. T. H. G. GARTLAND, Secretary.

Devon County Council.
(MEDICAL DEPARTMENT).

DEPUTY COUNTY MEDICAL OFFICER.

Applications are invited from duly qualified Medical Practitioners (Male), under forty years of age, for the appointment of Deputy County Medical Officer under the Devon County Council.

Applicants must possess a Diploma in Public Health, and have had experience in County Public Health Work.

The appointment will be subject to the Local Government and Other Officers' Superannuation Act, 1922.

The salary will be £720 per annum, rising by annual increments of £20 to £800.

Travelling and out-of-pocket expenses in accordance with the Council's Scale will be paid.

Applications, stating age, qualifications and experience, together with copies of three recent testimonials, shall be made on the prescribed form and forwarded so as to reach the County Medical Officer, 4, Barnfield-crescent, Exeter, Devon (from whom copies of application, forms, and full particulars of the appointment may be obtained), not later than the first post on Friday, 12th January, 1934.

City of Nottingham.

ASSISTANT MEDICAL OFFICER AT CITY INFIRMARY.

Applications are invited from qualified medical practitioners for a position as Assistant Medical Officer (Resident—Male) at the City Infirmary, Nottingham.

The hospital contains about 880 beds for the treatment of all classes of sick persons. It is a recognised training-school for nurses, and is equipped with all modern requirements.

Candidates must have held the post of House Physician and House Surgeon in a General Hospital, and preference will be given to those having had experience in a Poor Law Institution. Experience in the administration of Anæsthetics is also desirable.

The salary will be £350 per annum, rising by annual increments of £25 to £450, with rations and furnished apartments. Quarters for married men are not available. The successful candidate will be required to pass a medical examination, and to contribute to the Corporation's Superannuation Fund.

Forms of application, together with particulars of duties, may be had from the undersigned, to whom the application, with copies of not more than three recent testimonials, and endorsed "Medical Officer," should be forwarded not later than the 13th January. W. J. BOARD, Town Clerk.

Guildhall, Nottingham, 23rd December, 1933.

Erith and District Hospital.

The Board of Governors invite immediate applications for the post of HON. CONSULTING RADIOLOGIST, to supervise a new X ray-Electro-Medical Department.

Full particulars from Hon. Secretary, Erith Hospital, Kent. The appointment is urgent.

Ingham Infirmary, South Shields.

Wanted, JUNIOR HOUSE SURGEON (Male). Salary £150 per annum, with residence, board, and laundry. No out-visiting. Candidates must hold registered qualifications in medicine and surgery. The appointment will be terminable by one month's notice. Applications, stating age and accompanied by copies (which will not be returned) of recent testimonials, to be sent to the undersigned, from whom further particulars may be obtained.

JOHN POTTER, Secretary.

David Lewis Northern Hospital, LIVERPOOL.

(University of Liverpool Clinical School.)

The Committee invites applications for the post of:—
REGISTRAR TO THE ORTHOPÆDIC DEPARTMENT.

Particulars of the appointment as to honorarium, duties, &c., may be obtained on application to the Secretary-Superintendent.

David Lewis Northern Hospital, LIVERPOOL.

Applications are invited for the following resident posts:—
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Salary attached to the post of House Surgeon and House Physician is at the rate of £80 per annum, and that of Casualty Officer at £120 per annum, with board, residence, &c.

The posts will be tenable for a period of six months from 1st April next.

Applications, together with copies of testimonials, to be forwarded to the undersigned immediately.

THORNBURROW GIBSON, Secretary-Superintendent.
1st January, 1934.

Edenbridge District Hospital, Kent.

The Medical Committee invites applications for the post of HONORARY CONSULTING PHYSICIAN to the above Hospital.

Candidates should be graduates of a British university and members or Fellows of the Royal College of Physicians; engaged exclusively in consultant practice; and already holding an appointment on the staff of a regular London hospital.

Applications, stating age, qualifications and experience, and accompanied by two recent testimonials, should reach the Honorary Secretary of the Medical Committee by Friday, January 19th. No personal interview is required unless specially asked for.

Royal Infirmary, Sunderland.

(360 Beds.)

ASSISTANT PATHOLOGIST.

Applications are invited from registered Medical Practitioners or the above post.

Salary £350 per annum.

The successful applicant will work under the direction of the Pathologist, and will be required to devote the whole of his time to the Laboratory.

Apply, with copies of testimonials, stating age and experience, by January 18th.

J. A. BEARDSALL, House Governor and Secretary.

West Riding of Yorkshire Mental HOSPITALS BOARD.

FIFTH ASSISTANT MEDICAL OFFICER (registered and qualified) required in the Mental Hospitals Board's Medical Service at the MENSTON MENTAL HOSPITAL, near Leeds, at a commencing salary of £350 per annum, rising by annual increments of £25 to a maximum of £450, together with emoluments (board, apartments, and laundry), valued at £120 per annum. The Board will allow an extra £50 per annum to the gentleman appointed who (whilst in this scale) holds or obtains the Diploma in Psychological Medicine. Preference will be given to candidates who have had at least six months' general hospital experience, and also experience in general laboratory work. The appointment is subject to the provisions of the Asylum Officers' Superannuation Act of 1909. Applications, with copies of not more than three recent testimonials, stating age and full particulars, to reach the Medical Superintendent, West Riding Mental Hospital, Menston, near Leeds, not later than Monday, the 15th January, 1934.

G. L. BANNER, Clerk of the Board.
Board Offices, Wakefield, 2nd January, 1934.

Chester Royal Infirmary. (211 Beds.)

HOUSE SURGEON (Male) required for February 1st. Salary £150 per annum, with board, lodging, and washing. The appointment is approved for the examination for M.S. (Branch I.) Surgery (London Univ.) and similar examinations. Application list closes January 18th.

Application forms may be obtained from
W. H. GRACE, M.D., M.R.C.P.,
Hon. Superintendent of Resident Medical Staff.

Wingfield-Morris Orthopædic HOSPITAL, HEADINGTON, OXFORD.

HOUSE SURGEON required. Resident. Salary £100 per annum. Duties to commence on February 5th. Applications should be sent, with testimonials, to the Clinical Director by January 20th.

The St. Helens Hospital.

Applications are invited for the position of SENIOR HOUSE SURGEON (Male) to this Hospital at a salary of £200 per annum, plus board, residence, and laundry.

Applications, accompanied by three recent testimonials, to be sent to the Secretary, the St. Helens Hospital, Lancs, not later than January 16th, 1934.

Royal South Hants and Southampton HOSPITAL (275 Beds).

Applications are invited for the appointment of SENIOR HOUSE SURGEON for the period ending 31st December, 1934, at a salary of £200 per annum, with board, lodging, and laundry. Candidates must be male and unmarried, and must have had previous resident experience. The successful candidate will be required to take up his duties early in January. Applications, accompanied by not more than three testimonials, should be sent at once to the undersigned.

HY. TRUSSON, Secretary.

The Hospital for Sick Children, NEWCASTLE-UPON-TYNE. (85 Beds.)

Applications are invited for HOUSE PHYSICIAN and HOUSE SURGEON (Male or Female) to take up duties at once for three or six months. Salary at the rate of £100 per annum, together with board, residence and laundry. Applications, stating age and qualifications together with copies of testimonials, to be sent to the Secretary, Mr. NEIL BRODIE, 18, City-road, Newcastle-upon-Tyne, 1.

Ancoats Hospital, Manchester.

HOUSE PHYSICIAN.

House Physician required for a period of six months, to commence duty on 1st February next. Salary at the rate of £100 per annum, with board, residence, laundry, &c.

Applications, stating age, qualifications and experience, if any, to be forwarded to the undersigned, together with copies of three recent testimonials, on or before Wednesday, 17th January.—By order of the Board.

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Wanted Urgently by the London MISSIONARY SOCIETY, a fully qualified MEDICAL WOMAN for JIAGANJ, SOUTH INDIA.

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A letter to the Readers of The Lancet and to all my friends and supporters in the Medical Profession.

In accordance with my usual custom in this Special Number of The Lancet, I wish to tender my sincere thanks to all for whom I have done business and to wish them a happy and prosperous New Year.

I would remind the Profession generally that mine is now the oldest Agency in the Kingdom (established in 1873), and is still conducted by me personally, aided by a son and an efficient staff, and I trust my services during this period have proved beneficial to all who have consulted me.

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